THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LVII. No. 1464.] LONDON, JUNE 2, 1891. [43RD YEAR. Price 6d.

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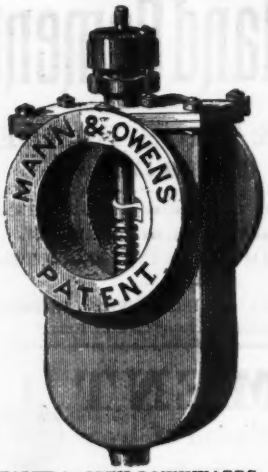

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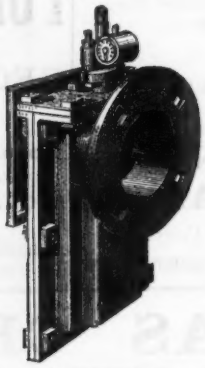

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for Regulating the Seal
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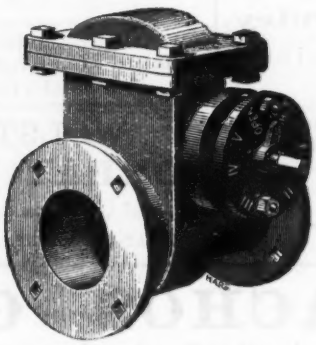

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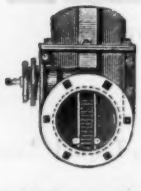

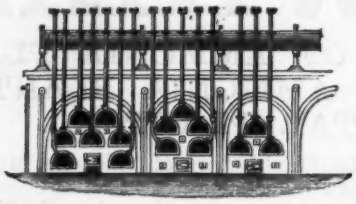

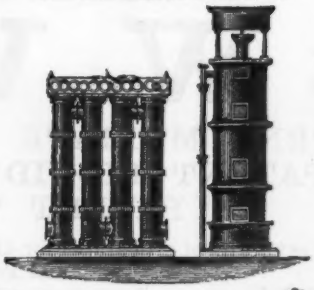

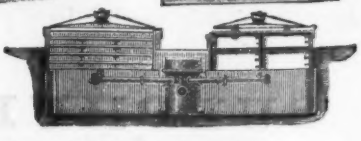

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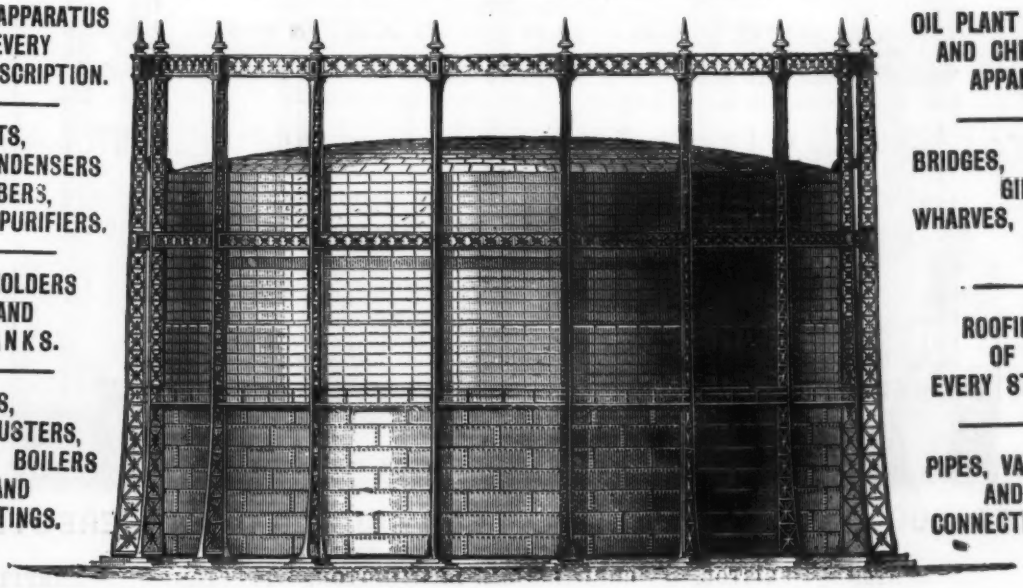

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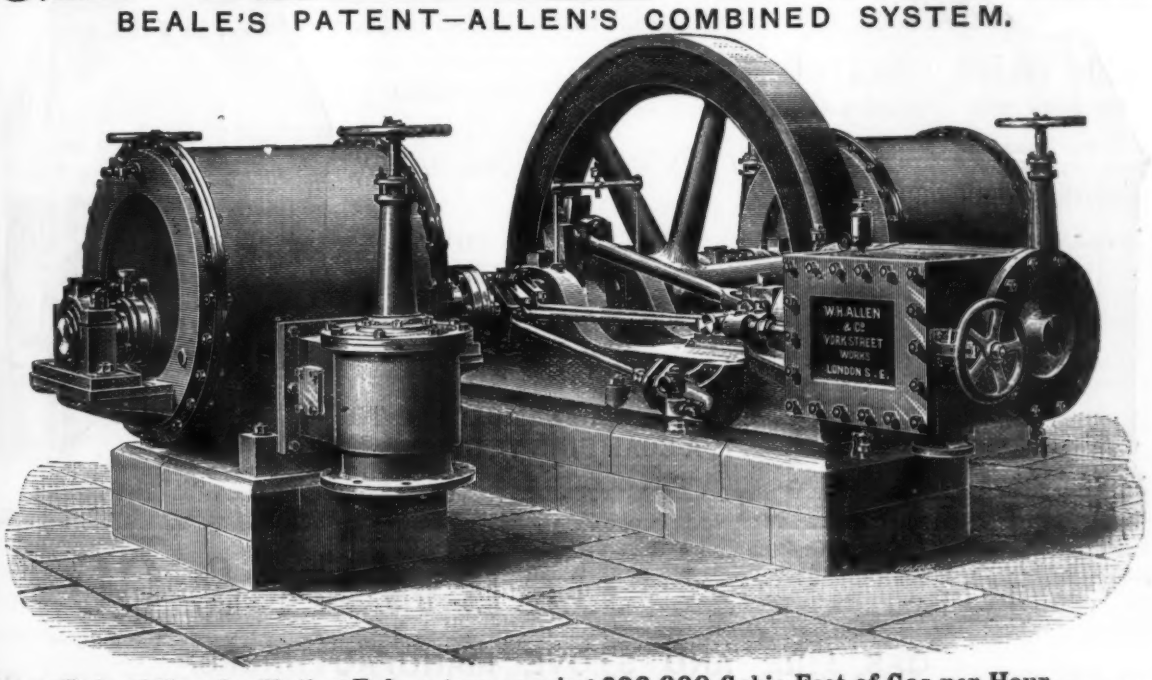

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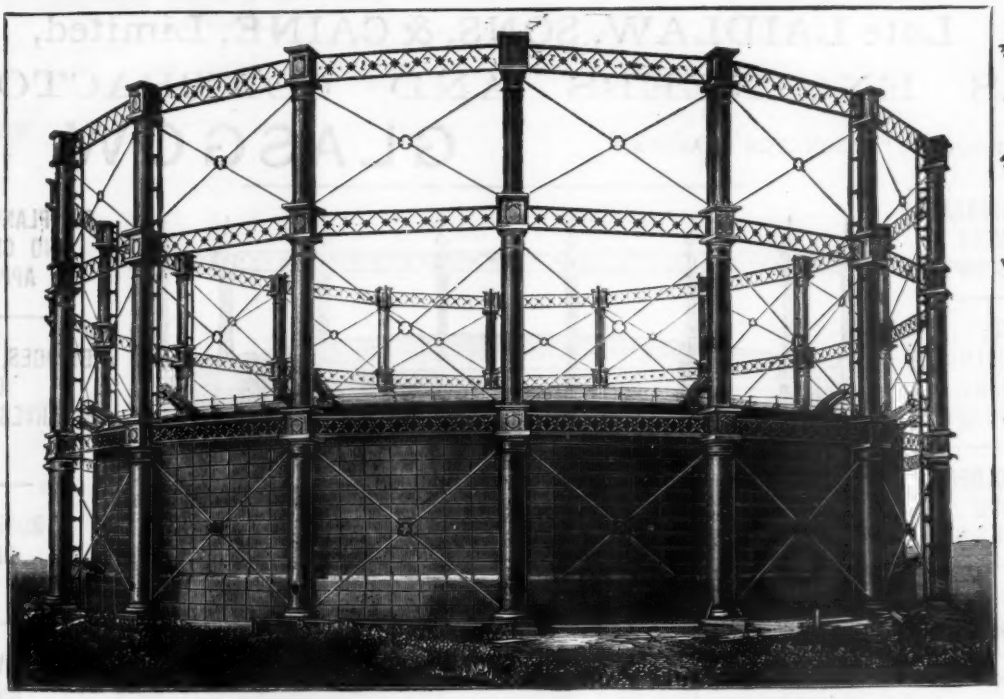

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Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

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TOTAL WEIGHT REDUCED
from 30 per cent. to 50 per cent.

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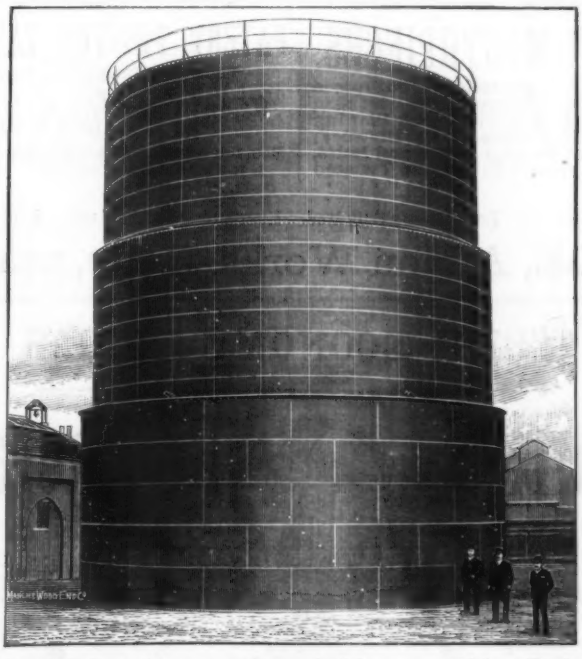
to the same extent; and in cases where gasholders are shipped abroad to places difficult of access, this represents a very large amount of money.

TANK CONSTRUCTION SIMPLIFIED.
The Tank wall (of whatever construction) is a regular cylinder. There are no piers needed, and all expensive foundation stones for the base of columns or standards are dispensed with.



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TILTING UTTERLY IMPOSSIBLE;
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STABILITY UNDER WIND PRESSURE
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The removal of heavy guide carriages and rollers from the top curbs considerably lowers the centre of gravity of the structure, and dispenses with the extra strength of sheeting necessary to carry these at the points where they are attached to the gasholder.

The plan adapts itself to telescoping to any reasonable extent, and enables very shallow holders or lifts to be employed with perfect stability.

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Lamps giving 20-Candle power consume less than four feet of Gas per hour.

PURE WHITE & PERFECTLY STEADY LIGHT,

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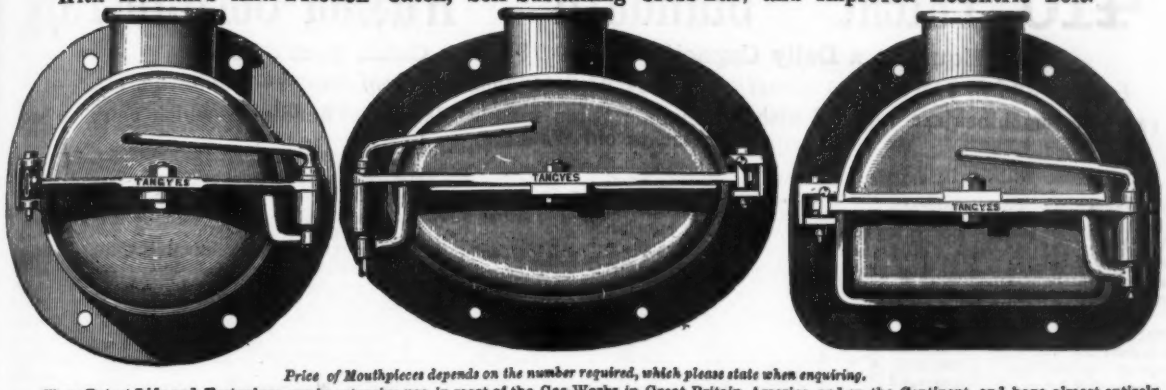
MORTON'S SELF-SEALING RETORT-LID

With Holman's Anti-Friction Catch, Self-Sustaining Cross-Bar, and Improved Eccentric Bolt.



Price of Mouthpieces depends on the number required, which please state when enquiring.

These Retort Lids and Fastenings are in extensive use in most of the Gas-Works in Great Britain, America, and on the Continent, and have almost entirely displaced the older method of sealing by a luting of lime or other material. The Lids are made in three forms, round, oval, and D (as shown above), in each of which we have a very extensive variety of patterns, from which Gas Engineers contemplating the adoption of these lids are recommended to make their selection, in order to avoid cost of pattern making, delays, &c., &c.

Mouthpieces with Circular Lids for Round Retorts.

Pattern No.	Diam. Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	Lid and Fittings without Mouthpiece.
3494	14 ins.	14 ins.	12½ ins.	£0 19 0
2982	15 ,,	15 ,,	14 ,,	1 0 0
3453	15 ,,	15 ,,	12½ ,,	1 0 0
3497	15 ,,	15 ,,	15 ,,	1 0 0
3630	16 ,,	16 ,,	10½ or 11⅝ ,,	1 1 0
4549	16 ,,	16 ,,	15⅛ ,,	1 1 0
6262	16 ,,	16 ,,	13½ ,,	1 1 0
6396	16 ,,	16 ,,	15 ,,	1 1 0
7668	16 ,,	16 ,,	17⅝ ,,	1 1 0
10289	16 ,,	16 ,,	11 ,,	1 1 0
3356	17 ,,	17 ,,	15 ,,	1 3 0
7125	17 ,,	17 ,,	6 ,,	1 3 0
933	18 ,,	18 ,,	11⅜ ,,	1 5 0
4045	18 ,,	18 ,,	14 ,,	1 5 0
6397	18 ,,	18 ,,	15 ,,	1 5 0
8013	18 ,,	18 ,,	15 ,,	1 5 0

Taper Circular Mouthpieces with Circular Lids for Round Retorts.

	Front. Back.			
13001	15 to 21 ins.	21 ins. diam.	13½ ins.	£1 0 0
13261	15 ,, 24 ,,	15 ,,	13½ ,,	1 0 0
12995	15 ,, 30 ,,	30 ,,	18 ,,	1 0 0
9562	18 ,, 21 ,,	21 ,,	12½ ,,	1 5 0
10425	18 ,, 21 ,,	21 ,,	4½ ,,	1 5 0
13418	18 ,, 22 ,,	22 ,,	12 ,,	1 5 0
13396	20 ,, 20⅝ ,,	20⅝ ,,	4 ,,	1 11 0

Mouthpieces with Circular Lids for D Retorts.

Pattern No.	Diam. Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	Lid and Fittings without Mouthpiece.
5348	14 ins.	14 × 18 ins.	7 ins.	£0 19 0
14209	14 ,,	14 ,, 13 ,,	13½ ,,	0 19 0
14231	14 ,,	12⅝ ,, 19⅝ ,,	10 ,,	0 19 0
3463	15 ,,	15 ,, 18 ,,	14 ,,	1 0 0
6678	15 ,,	15 ,, 14 ,,	12 ,,	1 0 0
3661	15½ ,,	15½ ,, 18 ,,	12 ,,	1 1 0
13052	16 ,,	16 ,, 18 ,,	18 ,,	1 1 0
5601	16 ,,	16 ,, 14 ,,	15 ,,	1 1 0
6827	16 ,,	16 ,, 14 ,,	17 ,,	1 1 0
4494	16 ,,	16 ,, 14 ,,	14 ,,	1 1 0
3548	16 ,,	16 ,, 15 ,,	12½ ,,	1 1 0
6677	16 ,,	16½ ,, 13½ ,,	12½ ,,	1 1 0
9845	16 ,,	16½ ,, 13⅝ ,,	13½ ,,	1 1 0
4434	16 ,,	17⅛ ,, 14 ,,	14 ,,	1 1 0
6469	16 ,,	18 ,, 14 ,,	15 ,,	1 1 0
9015	16 ,,	18 ,, 14 ,,	18½ ,,	1 1 0
4327	16 ,,	18 ,, 15 ,,	15½ or 19 ,,	1 1 0
6049A	16 ,,	18 ,, 15 ,,	17⅝ ,,	1 1 0
6137	16 ,,	20½ ,, 18⅝ ,,	13½ ,,	1 1 0
5918	17 ,,	18 ,, 14 ,,	14 or 17 ,,	1 3 0
5053	17 ,,	19⅝ ,, 12 ,,	14½ ,,	1 3 0
7548	17 ,,	20 ,, 13 ,,	15 ,,	1 3 0
6468	17 ,,	20 ,, 16 ,,	15½ ,,	1 3 0
4316B	17 ,,	21 ,, 14 ,,	14 ,,	1 3 0
7975	17 ,,	21 ,, 15 ,,	14½ ,,	1 3 0
13459	17 ,,	21½ ,, 13½ ,,	15 ,,	1 3 0
14284	18 ,,	18 ,, 13½ ,,	19 ,,	1 5 0
12990	18 ,,	18 ,, 15 ,,	15 or 19 ,,	1 5 0
7135	18 ,,	18⅛ ,, 15 ,,	13 ,,	1 5 0
10221	18 ,,	18 ,, 16 ,,	12⅝ ,,	1 5 0
4506	18 ,,	20 ,, 13 ,,	19½ ,,	1 5 0
6470	18 ,,	20 ,, 18 ,,	15 ,,	1 5 0
6818	18 ,,	20 ,, 13½ ,,	17½ ,,	1 5 0
13998	18 ,,	20 ,, 14 ,,	19½ ,,	1 5 0
4083	18 ,,	20 ,, 15 ,,	16 ,,	1 5 0
5306	18 ,,	20½ ,, 14 ,,	13½ ,,	1 5 0
13295	18 ,,	20½ ,, 14 ,,	19½ ,,	1 5 0
7356	18 ,,	20½ ,, 13½ ,,	15 ,,	1 5 0
4569	18 ,,	21 ,, 14 ,,	18 ,,	1 5 0
3628	18 ,,	21 ,, 15 ,,	16 ,,	1 5 0
13999	18 ,,	22 ,, 14 ,,	19½ ,,	1 5 0
7640	18 ,,	22 ,, 12½ ,,	13½ ,,	1 5 0
14250	19 ,,	19 ,, 14 ,,	19 ,,	1 8 6
14286	19 ,,	20 ,, 13½ ,,	20 ,,	1 8 6
7971A	20 ,,	20 ,, 15 ,,	18 ,,	1 11 0
14285	20 ,,	21 ,, 13½ ,,	19 ,,	1 11 0

Mouthpieces with Circular Lids for Oval Retorts.

Pattern No.	Diam. Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	Lid and Fittings without Mouthpiece.
13658	14 ins.	14 × 12 ins.	15 ins.	£0 19 0
4356	14 ,,	18½ ,, 12 ,,	12½ ,,	0 19 0
6851	15 ,,	16 ,, 14 ,,	13 ,,	1 0 0
3629	15 ,,	18½ ,, 13½ ,,	14 ,,	1 0 0
3580	15 ,,	21 ,, 15 ,,	15 ,,	1 0 0
6264	16 ,,	18½ ,, 15½ ,,	15½ ,,	1 1 0
5210	16 ,,	20 ,, 14 ,,	15 ,,	1 1 0
6263	16 ,,	24 ,, 16 ,,	15¾ ,,	1 1 0
5370	17 ,,	20 ,, 14 ,,	14 ,,	1 3 0
6832	17 ,,	20 ,, 14 ,,	17 ,,	1 3 0
6163	17 ,,	20 ,, 15 ,,	15 ,,	1 3 0
4289	17 ,,	21 ,, 15 ,,	14 ,,	1 3 0
5270	17 ,,	22 ,, 14 ,,	14 ,,	1 3 0
3631	18 ,,	18 ,, 14 ,,	20 ,,	1 5 0
5681	18 ,,	21 ,, 14 ,,	18½ or 15 ,,	1 5 0
3554	18 ,,	21 ,, 15 ,,	14½ ,,	1 5 0
7957	18 ,,	22 ,, 16 ,,	14 ,,	1 5 0
8048A	19 ,,	25½ ,, 15 ,,	18 ,,	1 6 6

Mouthpieces with Oval Lids for Oval Retorts.

Pattern No.	Dimensions of Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	Lid and Fittings without Mouthpiece.
9800	18 × 14⅞ ins.	18 × 14⅞ ins.	15 ins.	£1 5 0
9205	20 ,, 12 ,,	24 ,, 14 ,,	10½ ,,	1 10 0
10000	20½ ,, 14½ ,,	20½ ,, 14½ ,,	16 ,,	1 10 0
9680	21 ,, 15 ,,	21 ,, 15 ,,	15 ,,	1 12 0
10056	21 ,, 14½ ,,	21 ,, 14½ ,,	15⅜ ,,	1 12 0
13218	21 ,, 15 ,,	21 ,, 15 ,,	17 ,,	1 12 0
10514	22½ ,, 13⅜ ,,	22½ ,, 13⅜ ,,	13⅜ ,,	1 13 0
13766	20 ,, 17 ,,	20 ,, 17 ,,	15¼ ,,	1 15 0
13269	24 ,, 15 ,,	24 ,, 15 ,,	16 ,,	1 18 0
13884	24 ,, 15 ,,	24 ,, 15 ,,	10 ,,	1 18 0

Mouthpieces with D Lids for D Retorts.

Pattern No.	Dimensions of Mouth.	Internal Dimension of Retort.	Length of Mouthpiece.	Lid and Fittings without Mouthpiece.
12292	15½ × 13 ins.	15½ × 13 ins.	12 ins.	£1 2 0
9967	16 ,, 14 ,,	16 ,, 14 ,,	15½ ,,	1 3 0
13574	16½ ,, 13½ ,,	16½ ,, 13½ ,,	12½ ,,	1 4 0
9899	18 ,, 12 ,,	18 ,, 12 ,,	14 ,,	1 4 0
12980	16 ,, 16 ,,	16 ,, 16 ,,	18 ,,	1 6 0
13900	18 ,, 13½ ,,	18 ,, 13 ,,	15 ,,	1 6 0
9912	18 ,, 13½ ,,	18 ,, 13½ ,,	17 ,,	1 6 0
9962	18 ,, 13½ ,,	18 ,, 13½ ,,	16 ,,	1 6 0
10982	18 ,, 13½ ,,	18 ,, 14 ,,	15 ,,	1 6 0
11098	18 ,, 14 ,,	18 ,, 14 ,,	12 ,,	1 6 0
9492	20 ,, 18 ,,	20 ,, 13 ,,	15 ,,	1 10 0
9208	20 ,, 13 ,,	20 ,, 13 ,,	19½ ,,	1 10 0
10251	20 ,, 13 ,,	20 ,, 13 ,,	15½ ,,	1 10 0
12964	20 ,, 13 ,,	20 ,, 13 ,,	18½ ,,	1 10 0
9909	20 ,, 13½ ,,	20 ,, 13½ ,,	17 ,,	1 10 0
12969	19½ ,, 15½ ,,	19½ ,, 15½ ,,	14 ,,	1 11 0
13781	20 ,, 15 ,, Front.	21 ,, 15 ,,	15 ,,	1 11 0
	21 ,, 15 ,, Back.			
14287	20½ ,, 14⅞ ,,	20½ ,, 4⅝ ,,	17 ,,	1 11 0
7692	21 ,, 15½ ,,	21 ,, 15½ ,,	16 ,,	1 11 0
12978	20 ,, 16 ,,	20 ,, 16 ,,	17 ,,	1 11 0
13252	20 ,, 16 ,,	20 ,, 16 ,,	18 ,,	1 11 0
13220	21 ,, 15 ,,	21 ,, 15 ,,	17 ,,	1 11 0
13992	21 ,, 16 ,,	21 ,, 16 ,,	17 ,,	1 11 0
8977	21½ ,, 13½ ,,	21½ ,, 13½ ,,	18½ ,,	1 12 0
8976	21½ ,, 13½ ,,	21½ ,, 13½ ,,	18½ ,,	1 12 0
10497	21½ ,, 13½ ,,	21 ,, 13½ ,,	18½ ,,	1 12 0
8037	21½ ,, 13½ ,,	21½ ,, 13½ ,,	18½ ,,	1 12 0
9908	21½ ,, 13½ ,,	21½ ,, 13½ ,,	15 ,,	1 12 0
10404	21½ ,, 13½ ,,	22 ,, 14 ,,	18½ ,,	1 12 0
12410	21½ ,, 13½ ,,	22 ,, 14 ,,	12 ,,	1 12 0
13822	21½ ,, 13½ ,,	22 ,, 14 ,,	15 ,,	1 12 0
10515	22½ ,, 12⅝ ,,	22½ ,, 12⅝ ,,	13½ ,,	1 12 0
7924	24 ,, 14 ,,	24 ,, 14 ,,	15⅝ ,,	1 13 0
13807	24 ,, 15½ ,,	24 ,, 15½ ,,	16 ,,	1 14 0
9015B	25 ,, 14 ,,	25 ,, 14 ,,	12½ ,,	1 14 0
10932	25 ,, 14 ,,	24 ,, 14 ,,	13½ ,,	1 15 0
12944B	22 ,, 16 ,,	22 ,, 16 ,,	16 ,,	1 15 0
14037	23 ,, 16 ,,	2 ,, 16 ,,	16 ,,	1 15 0
14119	23 ,, 16 ,,	22 ,, 16 ,,	18 ,,	1 15 0

Patterns marked A have Sockets at back to connect to Retorts; all the others are flanged. Patterns marked B have curved bottoms.

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Adelaide	600,000
Aldershot	200,000
Allegheny, U.S.A.	1,000,000
Ashton-under-Lyne	1,250,000
Amsterdam	1,500,000
"	1,500,000
Annaberg	200,000
Arcachon	100,000
Animal Charcoal Co.	200,000
Altoona, U.S.A.	350,000
Buxton	250,000
Bradford	1,000,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,000,000
"	1,000,000
"	3,000,000
Bremen	150,000
Baltimore, U.S.A.	1,000,000
"	1,000,000
"	1,000,000
Balmain, N.S.W.	125,000
Bishops Stortford	150,000
Blackpool	400,000
Brussels	1,250,000
"	1,250,000
"	750,000
"	1,250,000
Banbury	250,000
Birmingham	5,000,000
Birkenhead	2,500,000
Blackburn	1,500,000
Bochum	600,000
Burntisland	250,000
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Brisbane	1,500,000
"	300,000
Burton-on-Trent	1,500,000
Barcelona	350,000
Barking	100,000
Baerlien & Co.	20,000
"	420,000
Bombay	700,000
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"	500,000
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Berlin	150,000
Bournemouth	1,000,000
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Brunswick	300,000
Beck & Co., St. Louis	100,000
Barmen Rittershausen	600,000
Bexhill	125,000
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"	1,000,000
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Cheltenham	2 000,000
Cannes	200,000
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Copenhagen	200,000
Clevedon	200,000
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Cincinnati, U.S.A.	1,500,000
"	1,500,000
Chicago, U.S.A.	3,000,000
"	1,000,000
"	1,000,000
Chemnitz	1,000,000
Crewe	1,250,000
Colonial Gas-Works Co.	100,000
Cadiz	300,000
Charottenberg	600,000
Dudley	750,000
Driffield	100,000
Dukinfield	500,000
Dover	750,000
"	1,000,000
Deal	200,000
Derby	1,500,000
Dublin	3,600,000
Dowlais	100,000
Dousai	500,000
Denton	500,000
Derby, U.S.A.	350,000
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" "	1,000,000
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"	500,000
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Fenton	400,000
Friedenshütte	500,000
Fürth	400,000
Freiburg	200,000
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Glossop	300,000
Guildford	300,000
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Huddersfield	300,000
"	750,000
"	1,500,000
Hof	200,000
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Heckmondwike	500,000
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Hamm	200,000
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Inverness	250,000
Ilkley	200 000
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Kidsgrove	100,000
Königsberg	1,000,000
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The Gaslight and Coke Co.:—	
Beckton	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	2,500,000
"	2,500,000
Silvertown	1,000,000
Bromley	2,000,000
"	1,500,000
"	1,500,000
"	1,500,000
"	2,000,000
"	1,500,000
Shoreditch	2,500,000
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"	1,500,000
Pimlico	2,000,000
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Kensal Green (2)	3,000,000
South Metropolitan Co.:—	
Greenwich	3,000,000
Woolwich	400,000
Vauxhall	3,000,000
"	3,000,000
Lea Bridge	300,000
West Ham	1,500,000
"	3,000,000
Leeds	2,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	2,000,000
Leominster	150,000
Leiden	560,000
"	600,000
Liverpool	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
" (3)	3,000,000
Lincoln	1,000,000
"	600,000
Lowell, U.S.A.	1,000,000
Laclede, "	1,000,000
Louisville "	1,500,000
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Lille	900,000
"	450,000
"	750,000
"	250,000
"	250,000
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Marseilles	1,500,000
"	1,500,000
Mons	500,000
Malines	250,000
Melbourne	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
Manchester	2,500,000
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"	2,500,000
"	2,500,000
"	2,000,000
"	1,500,000
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"	1,750,000
"	1,750,000
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"	1,000,000
"	2,500,000
"	50,000
"	50,000
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"	1,500,000
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"	2,000,000
"	1,000,000
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"	2,000,000
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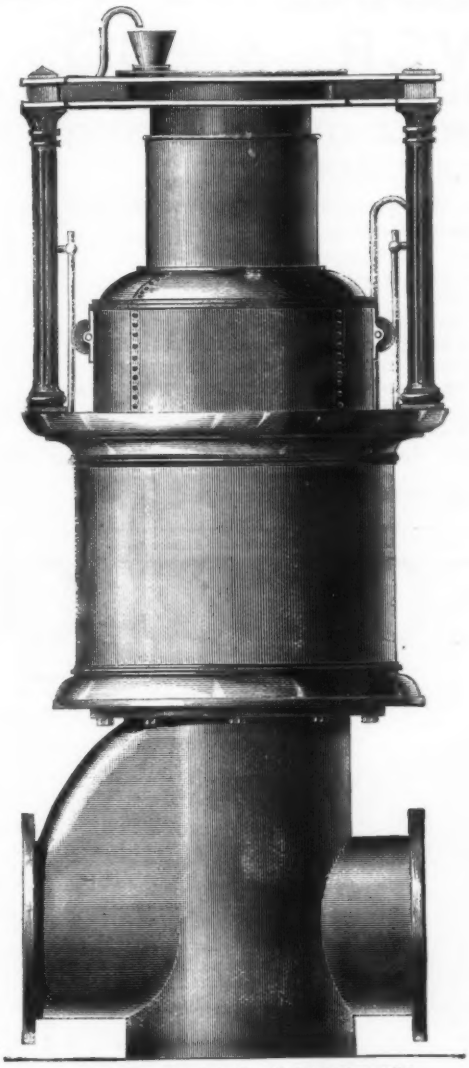
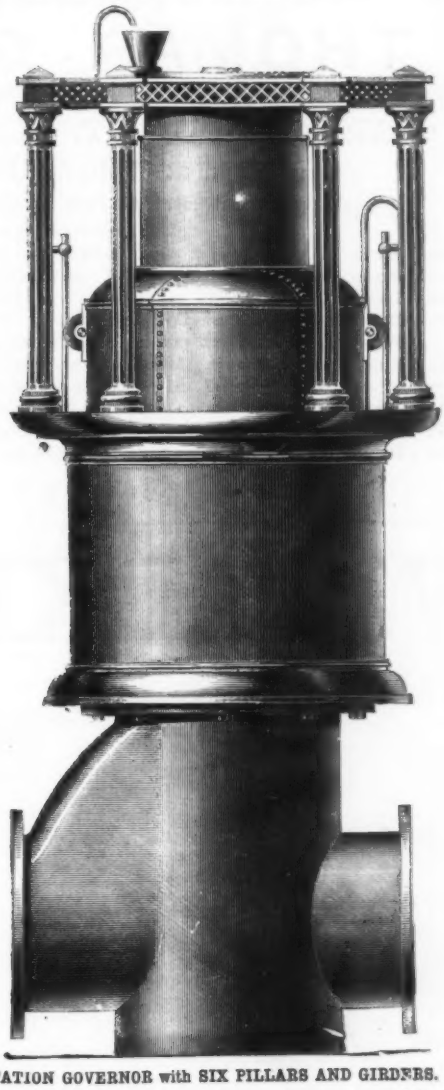
Another and a great advantage is the **unique water-loading arrangement,** which is made perfect and complete by the use of **WM. COWAN'S PATENT "STATIONARY SYPHON."**



STATION GOVERNOR with TWO PILLARS.



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Are upheld for five years without charge.

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MANCHESTER.
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[See also Advt., p. 1100.

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TO ADVERTISERS.

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THE
JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 2, 1891.

Social Problems.

THE strike of London tailors last week, and its termination in consequence of a vote of the majority of the men, do not at first sight appeal specially to the class of readers for whom the JOURNAL is written, as constituting matter of particular interest for them; but in reality this incident of modern industrial development is pregnant with teaching, not merely to gas supply administrators in their capacity of employers of labour, but also in relation to their business prospects. And lest we should be accused of pedantry in making this statement, it may be as well to observe that the fact has already been discovered by a scientific contemporary which cannot be suspected of a tendency to see gas in everything, as might be alleged with a colour of probability in our case. For the tailors who struck work in order to quicken the perceptions of some employers with regard to the pressing character of certain reforms demanded by the men, and already conceded by many firms, put in the forefront of their claim the question of factory *versus* home labour, which is a question that includes among its chief factors the possibility of the distribution of cheap power by means of the gas-engine. It is in the gas-engine, therefore, that the interests of gas supply and of the tailors' trade find a point of contact, which invites us to discuss the tailors' demands from the side of their bearing upon the gas industry.

For many years the subject of factory working has sorely exercised the minds of social reformers. It has been recognized, as a commonplace of Sociology, that it is the factory system which has been mainly instrumental in revolutionizing the condition of workers in the textile and many other industries. The factory system involves the factory town; it has created the factory "hand;" and it is represented in the England of to-day by such striking illustrations as Manchester, Huddersfield, Bradford, and a hundred other centres of population and work which were hardly heard of in the world before steam power was applied to the loom and the spinning-frame. Originating in England, the system has spread, and is spreading, over the whole world; and it is as profoundly modifying the life of the industrial population of India as it did that of the Lancashire peasantry in the beginning of the century. The factory, with all that it entails and involves, is the result of the steam-engine. From the moment when it was proved that the steam-engine was a cheaper source of energy than the cottage weaver, the concentration of weavers and spinners in order to take the fullest advantage of this cheap energy was an inevitable consequence. The instigation in this direction was of a strictly economic character, and had no reference to moral or social considerations. The movement progressed and gathered volume as the economic results grew more conspicuous; and a school of publicists arose who taught and believed that the commercial end justified every aspect of the means. But the conscience of the nation did not accept the commercial effect as compensating for everything in the newly-organized factory system; and Mrs. Browning's "Cry of the Children" proved more powerful in the long run than all the high and dry arguments brought forward by the Bright party in favour of leaving economical laws to settle the relations of employers and employed.

The condition of factory operatives having been made a subject for legislation, the whole factory system was next fiercely assailed by those who scouted the idea that flesh and blood must always be subservient to pecuniary considerations; and a very important and influential order of social reformers found no difficulty in arriving at the conclusion that the system is all wrong—hopelessly wrong—and ought to be abolished. The establishment of home industries was advocated as the only means of curing the evils of the system. There has been a good deal of literature expended upon the elaboration of this idea. It was never imagined that the primitive state of manufacturing industry represented by the weaver in his cottage by the village green, with his spinster daughters once more justifying their legal designation by their ordinary employment, could ever be revived in this country. It was argued, however, that the era of the gas-engine would supersede that of the steam-engine; and that instead of compelling the worker to go to the power he might require in his trade, it would be possible to bring the power to him. Pretty pictures of the results that might be expected to ensue upon the re-domestication of the town worker were drawn by many enthusiasts; and the ideal was discussed with approbation in the JOURNAL.

Once more, however, it has become manifest how many difficulties environ the well-meaning social reformer. While some non-labouring enthusiasts were engaged in abusing the factory system, and endeavouring to persuade the community that the decentralization of industry, and its restoration to the home by the aid of the gas-engine or the small-power hydraulic or hot-air motor, was an aim worthy

of the devotion of all far-seeing philanthropists, they do not seem to have sufficiently regarded the condition of those workers whose sphere of labour has been traditionally at home. Prominent among these are the journeymen tailors, for whom the factory system has never come into more than partial operation; because, as a matter of fact, theirs is a handicraft which does not require the aid of steam power. Yet this very circumstance of tailoring being a home trade is put forward as a grievance by the men who recently struck in London; and for very weighty and intelligible reasons. They argue that the condition of the workmen will never be shown in daylight, much less improved, until the employers provide healthy, convenient factories for working in, and have their work done under their own supervision, instead of sending it out to be mucked up by nobody knows who in the workpeople's own homes. Public sentiment undoubtedly sides with this view of the matter; for every tailored man and woman has a close personal interest in knowing whether the garments purchased from a fashionable tradesman are put together in a clean, wholesome workshop, by hands whose suitability for the task is vouched for by a responsible foreman, or are sent out reeking with the effluvia of a crowded "home" stricken with loathsome disease. The gas-engine does not drop out of the problem; it is only enlarged, and made a reality of the town factory, instead of continuing as a mythical appanage of the hypothetical cottage worker's home.

The tailors' strike is also worthy of notice as a case of the organization of labour for coercive purposes in which the sense of the majority actually determined the course followed—first in striking, and then in resuming work. There does not appear to have been any usurpation of the control of operations by the Executive, beyond the necessary details of administration. The agitation that culminated in the strike began, it is stated, in 1882, when representations of what the men wanted for the improvement of their position and the redress of grievances were made to the employers. Ever since then, the pressure for reform has been kept up; and so successfully, that many employers conceded the terms asked for. Others, however, as might be supposed, held out obstinately; and it was in order to bring these "to reason" that the strike was determined upon. When the employers were thus made aware that the men were in earnest, mediation speedily supervened upon conflict; and on Thursday last the members of the Union decided by a large majority, in a ballot arranged for by their Executive, that the employers had so far met their demands as to justify the resumption of work on the following day. This strike, upon the policy or rights of which we do not pronounce, was therefore successful, short-lived, and terminated by a vote of the men themselves. Attention to these facts is recommended to the wire-pullers of the New Unionism, one of whom—the notorious John Burns himself—has quite recently been driven to confess that his whilom dupes are sick of striking. Why? Because, we say, the strike idea has been carried to the extreme of mania by Burns and his fellows, who, while "standing from under" themselves, have brought ruin and untold suffering upon tens of thousands of the ignorant and misguided men who trusted them. Striking, as the example of the tailors and the carpenters and joiners shows sufficiently clearly, is always possible to workmen when they think it worth while to proceed to extremities; but striking to gratify a Burns or a Michael Henry is another matter.

The plain truth that whereas some Trades Unions exist for the sake of the members, others have been created and are kept up mainly for the benefit of the officials and paid wire-pullers, is become by this time too prominent to be denied. On the one hand, we see the question of strike or no strike decided by ballot of the members; and, on the other, we see a Union Convention deciding to place the general funds more completely at the disposal of the Executive than before. The comparison is instructive. We have been accused of entertaining a dislike of Trades Unions of every sort and however managed; but this is a misrepresentation. Self-help is the true mainstay of every individual and class; and it is both right and politic for men to unite for the purpose of improving their position. What we always have opposed, and always shall denounce, is the folly, imposture, and self-seeking which makes a cloak of Unionism; and while pretending to deliver the workman from bondage to his employer, would impose upon him a tyranny tenfold worse. This it is which has made the term of New Trades Unionism to stink in the nostrils of sensible men and peaceable citizens; and not all the Social Democratic-Fenian-Salvationist Communism that is vented under the guise of Labour Politics by the mushroom growth of penny weekly newspapers will restore it to wholesome savour.

The Chartered Assessment Appeals.

THE assessment appeals of The Gaslight and Coke Company came on for hearing at the Clerkenwell Sessions-House on Monday of last week, before Sir Peter Edlin, Q.C., and Middlesex Magistrates. Mr. Littler, Q.C., led for the appellant Company, and the Solicitor-General (Sir Edward Clarke, Q.C., M.P.) for the Vestries. The Gaslight and Coke Company were advised by Mr. H. E. Jones, of the Commercial Gas Company, and Mr. Corbet Woodall. The Vestries had retained Mr. W. A. Valon, of Ramsgate; and the Islington Vestry had specially engaged Mr. W. R. Chester, of Nottingham. A report of the proceedings will be found in another column. The result so far is a surprise to nearly everybody concerned; for it appeared that the appellants had at the eleventh hour to modify their case, and consequently objected to proceed. What may be the effect of this curious manœuvre, executed in the face of the enemy, must be left for conjecture. It certainly looks as if The Gaslight and Coke Company had been drawn into the operation so forcibly condemned by Abraham Lincoln, of "swopping horses while crossing a stream." The Chairman eventually ordered an adjournment for six weeks upon the appellants paying the costs of the day. It would obviously be unfair to offer at this stage any comment upon these extraordinary proceedings. There may have been very good and sufficient reasons for the course that has been taken; but at present it looks decidedly peculiar. To state the condition of affairs precisely, the Company have obtained three weeks' grace for the purpose of bringing up fresh figures; their opponents have another three weeks for studying them when produced; and then a further interval of a week is allowed for moving the Court, &c. So that these already protracted proceedings cannot be actively resumed for at least six weeks from the present date.

Gas Workers and Socialists.

IT is reported that the "Annual Conference" of the Gas Workers' Union has been held in Dublin. Why in Dublin, is not immediately apparent, unless it has been thought desirable to pay a compliment to the Irish element in the management. A mass meeting in the Phœnix Park was an important item of the programme; and the most noteworthy feature of this gathering was the self-denial of the local agitators, who magnanimously "left the floor" to the English visitors. This is not at all a bad idea; for even the more stolid English audiences who patronize this kind of Sunday entertainment must grow tired of hearing the same stock company over and over again. Why should not the English organizers arrange for an "Irish Day," a "Scotch Day," and even for a "Welsh Day," by way of a change from their own sweet oratory? The mass meeting, however, was all that was seen in public of the Gas Workers' doings. The wire-pullers decided to recommend the conference not to admit the Press, but to supply a judiciously edited report to such newspapers as might be favoured with copies. Sad to relate, no such report has reached the office of the JOURNAL, which is, to say the least of it, unkind of Messrs. Aveling, Shears, and Irving, the members constituting the Press Committee of the Conference, seeing that we generally keep the personality of the gas industry well posted with regard to labour topics, Unionist and otherwise. However, we must console ourselves in our deprivation by the observation that no other journal or newspaper has fared better—or, at any rate, that the transactions of the Conference have not been regarded as of absorbing interest to anybody. One "Labour organ" dismisses the Conference in a line; another pretends to report the net results, but makes the sad blunder of ignoring Mr. Thorne's re-appointment to the office of General Secretary. In Dublin much more importance was attached to a letter sent by one of the delegates, with a shilling subscription, to the *Freeman's Journal* Fund in support of Mr. Parnell's leadership of the Irish National Party, than to anything else. The rash delegate was promptly disavowed by his associates in council; but the incident made the whole affair smell of

Irish politics. The prominence given to the Aveling contingent in the management of the organization is no improvement to its prospects of doing any more practical work in the future than it has done in the past; but this, of course, is more a concern of the paying members than it is of ours. One statement relative to the secret proceedings of the Conference strikes us as significant. It is reported that a resolution was passed "by means of which "the funds of the Union would become more centralized, "and be more ready for direction into any particular "direction where they may be required." If this does not mean that the wire-pullers at head-quarters are to have an even more uncontrolled power of appropriation over the money than ever, what else can it signify? It is a remarkable fact that Socialism in England was always out-at-elbows until its mouthpieces hit upon the happy thought of making common cause with the Trades Unionists who had control of the workmen's pence. The older Trades Unions were too wide awake to be caught by the Burns-Aveling contingent; and there was a time when Thorne gave the rough side of his tongue to the "black-coated" loafers who aimed at regenerating society at somebody else's expense. He has relinquished his independent position, however; and now the Gas Workers' Union has fallen meekly in the line which has Cunninghame Graham, M.P., in one part of it, John Burns somewhere else, and includes Parnell and Michael Davitt, pulling against one another at the Green Flag. What is Thorne doing in that galley? Force of circumstances has put him into it; but whatever power of usefulness his Union may have had, is impaired in the degree in which it is made subservient to political associations.

Accidents with Mineral Oil.

The dangers of petroleum have seldom been more glaringly illustrated to the popular eye than they were last week by the sensational catastrophe in Lord Romilly's household, and the contemporaneous disaster at Dunkirk. The latter was on a large scale, as regards the loss of both life and property; but it is only natural that the deaths of Lord Romilly and his domestics in Kensington should make more impression on the imagination of the people of this country. We all take so much more notice of what happens under our eye than of what occurs at a distance, that it would be wonderful indeed if the Kensington fatality passed without profoundly stirring popular feeling. The accident was so very simple, and might so easily have happened in every house where mineral-oil lamps are used! Indeed, it suggests so many reflections, that the difficulty is to know where to begin. The most striking point of the sad occurrence, to an observer who looks at these facts from the technical standpoint, is that, after so much has been done to render petroleum and paraffin oils safe illuminants, so little that was noticeably wrong about the lighting of this particular Kensington apartment should have proved sufficient to bring about as grave mischief as could well have followed from neglect of every precaution. Here was a lamp with a bronze body, standing upon an ornamental table in a drawing-room; the only occupant of the apartment at the time being a middle-aged gentleman. One minute this room would have appeared to a spectator to be the very shrine of quiet comfort; and the whole house was seemingly as assured of a peaceful night as wealth and prudence could secure for the building and its inmates. Another moment—a heedless movement—and with the upsetting of a single lamp death and destruction invade that still household. And all this, according to the experts who have examined into the circumstances, was because the lamp, placed where it could easily be overturned and thrown down, had no wick-tube reaching to the bottom of the oil chamber, and the burner merely slipped into its place, without being firmly screwed on. It is hardly surprising that the terrible story of Lord Romilly's death should seriously discompose other users of mineral-oil lamps. In the case of a poor family, the excuse might be offered that they could not afford to buy a safe lamp; but this explanation fails here, where the mischief is traceable to such a lamp as a nobleman would purchase for his drawing-room. It may at least be expected that, after this exhibition of the possibilities of danger lurking in lamps used in high places, the instructions issued by the Home Office to guide makers and buyers of such articles will be more carefully attended to.

WATER AND SANITARY AFFAIRS.

The Select Committee on the Metropolitan Water Supply Bills, having passed the preamble and settled the clauses of the Bill promoted by the Southwark and Vauxhall Water Company, have resumed their consideration of the Metropolis Water Supply Bill, promoted by the Vestries and District Boards. Thursday and Friday were thus occupied last week; and, on the latter of these days, the Chairman intimated, on behalf of the Committee, that they had decided not to sanction that part of the Bill which proposed the purchase of the undertakings of the Rickmansworth and Leatherhead Companies. Sir Matthew White Ridley explained that the Committee did not declare against the policy of such a purchase; but it was not a subject they could at all entertain. It would seem that this very seriously affects the prospects of the Bill. According to the plan which the Bill propounded, the water to be obtained from the districts of these two Companies was to supplement the existing Metropolitan supply, so as to meet the future increase in the demand. Mr. Grover, the Engineer to the scheme, stated, in his evidence, that he contemplated adding something like 20 million gallons of water a day from the Rickmansworth district; but he considered it capable of yielding a much larger quantity. In support of this opinion, he was able to quote the authority of Stephenson. There would also be 10 million gallons extra from Leatherhead. But now, by the decision of the Committee, all this part of the scheme is cut out of the Bill. Mr. Rickards tried to preserve the project intact, by pleading that the Bill only gave the proposed Trust power to purchase the undertakings in question, and did not compel them to do so. We are rather surprised to find the Chairman assenting to this statement, although again declaring that the Committee would not pass that part of the Bill which dealt with the Leatherhead and Rickmansworth water. According to our reading of the Bill, these two outlying Companies stand on exactly the same footing as the eight Metropolitan Companies in respect to the purchase of their undertakings. But, supposing a distinction to exist, as stated by Mr. Rickards, the decision of the Committee becomes all the more emphatic; and it would be interesting to know what are the precise grounds on which the Committee base their decision. Are they afraid that the 30 million gallons per day would be so much water abstracted from the volume of the Thames? Or do they consider that the district itself cannot spare the water? We may conjecture further that the Committee wish to see a supply taken from some distant source—in Wales or elsewhere. If the purchase of the Leatherhead and Rickmansworth undertakings was simply permissive, as stated, the Water Trust would be left entirely free to take their own course with regard to the matter, even if the clauses were retained. To destroy that option is a very decided step, and seems to indicate in the mind of the Committee a preference for an entirely new scheme of water supply for the Metropolis. The exclusion of these two districts may be said to throw discredit on the plans of the London Companies for drawing an enlarged supply from the chalk in the vicinity of London. If this resource is to be abandoned, there is no alternative but that of going to a great distance, at heavy expense. The Committee may not contemplate this; and they have no Bill before them proposing such a course. But the County Council Bill, which may be expected to reach the Committee shortly, proposes an open door, through which any scheme might be introduced. To-day the County Council are to be heard in opposition to the Vestry Bill; the case for the promoters being closed. In that opposition the Corporation are expected to take part, having the promise of the County Council that, if they will co-operate with that body, they shall have some share in the future management of the supply. The programme now consists in getting power for the County Council to introduce a scheme, in which scheme the Corporation shall slightly participate. But what course the Select Committee may take, is yet an enigma. The County Council, we may observe, intend to seek further amendments in the Southwark and Vauxhall Bill in the House of Lords.

A smart discussion took place in the Court of Common Council last Thursday, respecting the present attitude of the City Corporation on the water supply question, as adverted to in these columns a fortnight ago. Mr. Bedford

elicited from the Remembrancer that about thirty-five Counsel are employed in connection with the proceedings before the Select Committee; four being engaged on behalf of the Corporation. Mr. Bedford wished to know whether the Corporation were prosecuting a Bill on the water supply of the Metropolis, after their own Bill had been thrown out. The Remembrancer did not admit that the Corporation Bill was "thrown out." The preamble had not been proved—that was all. Mr. Bedford pressed the question a little further, and wished to know whether power had been given to the Corporation Committee to enter into an arrangement by which the Corporation should supply one-eighth of the representation, "and pay "all expenses." The Remembrancer replied by saying that the statements contained in a paper sent round the Court were correct. What kind of statements they were, may be inferred from the remark of Mr. Bedford, who said some of them were so extraordinary that he could not believe them. On demanding the authority for the course taken, he was referred to the Chairman of the County Purposes Committee. Asked as to who was responsible for the policy being pursued on this subject, the Remembrancer replied that all this was "left to the "London County Council." Such was our understanding of the matter a fortnight ago. But now, as a sufficient explanation, we find Mr. Rose-Innes asking the Remembrancer whether, behind the statements which excited the surprise of Mr. Bedford, there were not "very good "reasons of a legal character." The Remembrancer replied in the affirmative; but what these reasons were, did not appear. We presume the Corporation have no legal right to anything, and simply agree to take what they can get—namely, the one-eighth representation; while the County Council take possession of the entire water supply and its revenues. If Gog and Magog like to have it so, all depends on whether or not Parliament will further the design.

Mr. H. Reader Lack, Comptroller-General of the Patent Office, had the honour of knighthood conferred upon him by Her Majesty, on the anniversary of her birthday.

Professor Vivian B. Lewes, F.I.C., F.C.S., has been awarded, by the Institution of Naval Architects, the Gold Medal of the Institution, for his paper on "Boiler Deposits," read at the recent annual meeting.

Institution of Civil Engineers.—The annual general meeting of this Institution was held last Tuesday, when the report of the Council, with the annual statement of accounts, was presented. During the past session, twenty-three ordinary meetings were held, at which eleven papers were read and discussed. For some of these, Telford Medals and Telford Premiums have been awarded to Messrs. Ll. B. and C. W. Atkinson, and to Mr. R. E. B. Crompton; and Telford Premiums to Messrs. F. E. Robertson, E. W. Stoney, Professor John Milne and Mr. J. M'Donald, Mr. W. Langdon, and Mr. W. T. H. Carrington. For other papers, printed or to be printed in the Proceedings without being discussed, Telford Premiums have been awarded to Messrs. B. Donkin, jun., J. J. Webster, and C. P. Sheibner. The effective increase in the roll of the Institution during the past year was 247. There were elected 2 honorary members, 51 members, 291 associate members, and 7 associates; and 3 associate members were restored to the register. Only 107 names have disappeared from the list. The Council congratulated the members that, as the result of protracted litigation with the Inland Revenue Department, the House of Lords upheld the judgment of the Court of Appeal, that the whole of the property of the Institution is exempt from the corporation duty under the Customs and Inland Revenue Act of 1885, on the ground that it is legally appropriated and applied for the promotion of education and science. The report concluded with a reference to the action of a Committee of members outside the Council, which has resulted in the establishment of an endowment fund for the purpose of perpetuating the memory and the long services of the Secretary in the interests of the Institution. It has been decided that the endowment in question, with any future additions, should be applied to the establishment of a "James Forrest Lectureship;" it being left with the governing body for the time being to settle details. The report was adopted; and the usual votes of thanks were passed. The ballot for the new Council resulted in the election of Mr. G. Berkley as President; of Mr. H. Hayter, Mr. A. Giles, M.P., Sir R. Rawlinson, K.C.B., and Sir B. Baker, K.C.M G., as Vice-Presidents; and of Mr. W. Anderson, D.C.L., Mr. J. Wolfe Barry, Mr. E. A. Cowper, Sir J. N. Douglass, F.R.S., Sir Douglas Fox, Mr. J. Clarke Hawkshaw, M.A., Mr. C. Hawksley, Sir Bradford Leslie, K.C.I.E., Mr. G. Fosbery Lyster, Mr. J. Mansergh, Sir Guildford Molesworth, K.C.I.E., Mr. W. H. Preece, F.R.S., Sir E. J. Reed, K.C.B., F.R.S., M.P., Mr. W. Shelford, and Mr. F. W. Webb as other members of the Council. The session was then adjourned till the second Tuesday in November.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 1083.)

Another dull week has come to a close; and its gloom was not rendered any the lighter by the depressing weather. Business was very flat; for everyone is extremely cautious. The uncertainty attending the way in which things will shape themselves in the next week or two, is enough to make the oldest and keenest dealer very chary of dipping his hand in deep. Then it was Epsom week; and those who had any stomach for the pursuit of pleasure under difficulties, betook themselves there, and so reduced the day population of Capel Court. The Money Market, too, is in a somewhat unsettled condition; and the shifty appearance of discount rates kept down the demand for accommodation. Even the Gas Market has suffered to a slight extent; and though changes of quotations are few in number, and inconsiderable in degree, yet they are nearly all for the worse. Transactions generally have been extremely restricted; and not one issue showed its normal activity. Gaslight "A," which in the preceding week gave some signs of an easier tendency, opened rather weaker, and fell away a point-and-a-half before the close. Business was done more than once at worse than 240. The debenture and preferred issues had quite a calm after their recent activity; and scarcely any business was done in them. The only one to move was "K," which, for some reason or other, seems to be most in demand, and tops all the rest n point of price. The limited "H," however, were more active. South Metropolitans were almost entirely neglected; and only on Friday did some "B" change hands—prices being good. A single bargain in the old stock was all the notice that Commercials met with. The Company are issuing a further £35,000 of the new stock at par, payable on the 1st of July. The stock issued is allotted to the proprietors as registered upon the 23rd ult.; and their new allotments amount to 5 per cent. upon their then holdings. Suburbans and Provincials have been quite without feature. The Foreign undertakings have shared the general quietude and flatness. Imperial Continental fell away 1; but there was afterwards some disposition to recover, and the last prices were the best of the week. Continental Union has also receded 1. The South Americans were fairly good; and Bahia is 1 better, *ex div.* Water has been almost stagnant, and nothing has moved at all.

The daily operations were: Gas opened quietly on Monday, and business continued restricted, at about average prices; quotations being unchanged. On Tuesday, there was next to no business at all; Gaslight "A" and "H" alone being dealt in. Wednesday was only a shade more active; but various changes took place. Gaslight "K" rose 1/4; and Bahia, 1. Imperial Continental fell 1. Thursday was the busiest day of the week; though that is not saying much. Gaslight "A" receded 1/4. The only feature on Friday was a fall of 1 in Continental Union. Saturday produced no alteration; and all quotations closed without further change.

ELECTRIC LIGHTING MEMORANDA.

The Distribution of Electric Light by Means of Gas-Engines—The Views of the "Electrician" respecting Large and Small Lighting Stations—A Supposititious Glasgow Experiment—Arc Lighting for Commercial Dungeons.

In connection with the supply of electric lighting by Gas Committees of Municipal Corporations, it is rather surprising that so little is heard of distribution by means of gas. Yet there are shrewd reasons for believing that where such a body has undertaken to supply electric light, this is one of the most practicable, and certainly the safest way of going to work. The idea, we believe, will be seriously considered in connection with the municipal electric lighting of Glasgow, if this proposed experiment is carried out. It is well understood by this time that there is no real economy or other advantage in generating electric light at a large station whence the current must be conveyed far and wide to the places of consumption by means of expensive conductors. Ever and anon, as large buildings come to be lighted electrically, it is noticed that they are provided with their own independent plant, although the mains of an electric lighting company may pass the door. The latest example of this general principle is the Imperial Institute building at South Kensington, which is to have a generating plant of its own, notwithstanding the fact that it is in the district of the Kensington and Knightsbridge Company, who would be glad of such a substantial addition to their consumption. The avowed reason for these independent plants is that they can supply cheaper than the central stations, provided that they are of a certain magnitude. The minimum size of an electric light plant to produce current at the lowest cost is dependent upon several things, of which the cost of attendance is one, and that of fuel another. Taking one consideration with another, it is probable that distribution of electricity for lighting by means of gas-engines, put down in close proximity to the place of consumption, would be found in many districts more economical than its distribution by means of conducting cables radiating from large central steam stations.

The idea expressed in the foregoing paragraph is largely

supported by the *Electrician*, which admits that, where light is wanted on a tolerably large scale, "it is undoubtedly cheaper to put down the generating plant than to make use of the energy provided by the supply companies." But this admission means nothing less than total contradiction of the views expressed ten years ago with such confidence by the late Sir W. Siemens and those who were his allies in forcing on the Electric Lighting Act. We were then told that nobody could expect cheap electric lighting until huge central stations were established, supplying current generated by engines of the largest size and most economical type. Well, we have such generators in a dozen places; and yet the *Electrician* confesses that the little private stations in the City and West-end, where gas-engines run the machinery, "have no difficulty in generating a unit for 4d.; and it is the trouble, and in some cases the noise, rather than the actual expense, which has induced so many clubs and theatres to take their supply from central stations rather than from their own machinery." But when the small station, just big enough to occupy a man's time to advantage, is managed by a public authority, the objection disappears while the cheapness remains. When accumulators are used, moreover, the gas-engine would be worked during the day-time, which would suit the gas undertaking admirably on more grounds than one. This is a system of supply which plainly requires more study than it has hitherto received.

Taking the case, for example, of a Corporation such as that of Glasgow, who have an Order which they are half afraid to put into use, seeing that not one of the municipal central stations they can hear of pays its way, and there is a competitor already in possession of the best districts. Supposing that, instead of putting down a large and costly plant somewhere, laying out a heavy capital sum in copper, and then waiting for custom, the Glasgow Gas Committee could ascertain that two or three adjoining warehouses or suites of offices would be willing to take a supply of electricity for lighting if it could be had for (say) 6d. per unit. In view of the advantageous price, the Committee could fairly look to be accommodated, at a reasonable rent, with a cellar into which they would put a couple of engines and the necessary electrical plant for supplying the first subscribers, and perhaps a neighbour if required. The engine-driver would attend daily, and the consumption of fuel would be no more than was needed—no banking of fires, no staff to be kept in readiness for an emergency, everything ready to be started in full work at a moment's notice. Would not this be an economical system? It would not be surprising if all the central station lighting companies were to envy it; for they are now learning what central station work is. According to the experience of the Metropolitan Company, the average time of daily use for every lamp wired is only 1¾ hours; and this has to pay for all the rest of the day. It becomes a serious question whether steam machinery can ever be profitably used under such conditions.

The "sanitary" card is usually one of the last that a promoter of new schemes for supplying town communities with necessaries thinks of playing. After enumerating all the more definite and obvious advantages of his project, whatever it is, he may wind up by claiming that its operation will be "beneficial to health;" but the benefit is necessarily so problematical that no precise valuation can be given to it. All manner of applications are given to this general formula. We remember that the promoters of the Lawrence Automatic Gas Company declared that their object was to preserve the public health from the undermining effects of the combustion of coal gas. Steam rollers have also been declared to possess recommendations on the score of sanitation; and between these extremes there is evidently plenty of choice for developments of the sanitary idea. About the oddest claim of this kind that has ever come under our notice, however, is advanced for electric lighting in the *Engineering Record*, of New York. It is declared, in this usually matter-of-fact print, that "one advantage which electric arc lights have over all other means of illumination is that they give off a very large proportion of chemical rays, and in this manner simulate the effects of sunlight. Dark rooms, cellars, and other places where sunlight does not come, and which are usually unhealthful, may therefore be expected to be quite as healthful, and to be as easily protected from foulness, when arc lights are used, as rooms where sunlight can freely enter. In dark stores and counting-rooms, the introduction of the arc light ought therefore to have a very decidedly beneficial effect upon the health of employees." Hence the cruelty of immuring white slaves in Yankee dungeons is to be ameliorated by permitting them the use of a means of lighting which is notoriously ruinous to the eyesight. The plea is ingenious; but we should like to hear what a coroner's jury would think of the idea of rendering a dark and noisome cellar habitable by merely hanging up an arc lamp therein.

Mr. Thomas Jowett has been appointed Manager of the East Grinstead (Sussex) Gas-Works, and yesterday commenced the duties of his new position.

Mr. J. G. Jones has been appointed by the Water Committee of the Cardiff Corporation to superintend the work of construction at the Cantreff reservoir. For several years, Mr. Jones has been in the employ of the Corporation Water Engineer (Mr. J. A. B. Williams) on the Cantreff and other reservoirs.

GAS CARBURETTING METHODS.

The subject of carburetting coal gas was very fairly elucidated by the papers and discussion of the second day of the Gas Institution meeting, which we have just published. In our last commentary on these proceedings we remarked that the two most pressing questions of the day for gas engineers relate, first, to the sort of gas to make; and, secondly, how to make it. We dealt last week sufficiently with the work of the Institution in regard to the latter problem; and we have now to offer a few critical observations on the former. The papers by Messrs. Goulden and Glasgow supplement most satisfactorily the information on the subject of water gas already made available for English use by Professor Lewes. It has been often noticed as curious that, while water gas was much talked about in this country, the experiments to which public attention was drawn referred to plant either unknown or very little used in the water-gas consuming towns of the United States. Such plant as that of the Stapp or the Steenbergh process, for example, whatever its value might be, did not come here with any such prestige of popularity at home as the Lowe plant and its chief modifications unquestionably possess. Until it could be definitely shown what this kind of water-gas plant was capable of doing in England, it was therefore impossible to say that water gas itself had had a fair chance in English gas-works. Now it can be truthfully said that all doubt and mystery have been cleared away from the subject. It is not that the prospects of water gas are indissolubly bound up with those of the Lowe system, as developed by the United Gas Improvement Company, of Philadelphia. But it may be said with justice that this is the fountain-head of technical knowledge in regard to carburetted water gas; and since—whatever may be the case in the States—this Company have here no patent monopoly or controlling connection with the Standard Oil Company, they must do their business upon ordinary market terms.

One conclusion is obvious from the recorded experience of Mr. Goulden and others—that it is the oil which governs everything in water-gas making, not merely the price of the product but also the character of the generator plant to be used. Plant that will make gas satisfactorily with one kind of oil will not do so with another. Since the oil governs the plant, American water-gas making practice is unavailable for instruction here, where the only available oils are of widely different character from anything used for gas making in the States. A good deal yet remains to be done in rendering available an ample supply of cheap and safe oils, if water gas is to be used with success in this country even as a stand-by in cases of emergency, or as an enricher of coal gas. The objection to water gas on the score of danger to the public, is serious enough without any complication with reference to the transport and storeage of large quantities of oil in gas-works. This could never be sanctioned unless the oil were as perfectly safe and practically harmless as tar. The only way in which such oil can be obtained is through co-operation with the gas interest of the refiners of low-priced hydrocarbons. There appears to be some prospect that when the precise kind of oil required is known, it will be forthcoming. The future of water gas in Great Britain depends upon the realization of this prospect. And since a given oil requires a suitable plant to gasify it—or, stating the case the other way, a particular description of plant will only properly treat a particular sort of oil—we look to the Beckton experiments as promising to develop a standard pattern of carburetted water-gas plant suitable for English use. Water gas must be made uniformly, or not at all.

The most striking contribution to the settlement of the question of carburetting gas, at least for the present, was that of Mr. Foulis, who expounded the value of oil as a direct carburetter. The necessity of making oil gas properly, if it is to be of any real value, was made apparent by Mr. A. F. Browne, who testified that rough-and-ready ways of carbonizing oil may result in failure. In point of fact, there are two or three things to be looked after by whoever essays to make oil gas for subsequent admixture with ordinary coal gas. In the first place, it is necessary that what is made should be really gas, and not oily vapour. If the latter is put into coal gas, which it eventually leaves for the more congenial company of the tar-well, the chances are that it will take with it some valuable luminants from the gas; so that the last state of that coal gas will be worse than the first. For this reason it is desirable that the oil intended for conversion into gas should not be hidden away in the coal, or squirted upon the charge in a retort, or treated in any such way as to make it difficult to say what really becomes of it. It is far better to carbonize it in special retorts, which will permit of the operation being watched over and controlled. There is nothing better than the Pintsch method for effecting this object—a sheet-iron tray in a retort to receive the stream of oil, and a second exposure to fix the vapour into gas. Taking the case of an ordinary "through" retort, if the oil supply were admitted at one end, allowed to drop into a tray occupying half the length of the retort, and the gas taken off at the other end, the gas would probably be as stable as it is possible to make it. If this arrangement did not suffice, probably the division of the retort into two vertical chambers by means of a horizontal tier of thin tiles supported

on bricks ranged along the sides, would supply more than enough fixing surface.

It is soon seen in the syphons and gasholder tanks whether the gasholder has contained oil vapours or properly made gas. When correctly made, oil gas is practically as permanent, at ordinary pressures and temperatures, as coal gas. If it were not so, Pintsch's process could not be worked. Most of the failures of oil-gas processes have been due to the fact that the gas has not been carefully freed from that which is not gas, but only vapour. Most of those who have been enthusiastic partizans of oil-gas schemes would have laughed to scorn the modest statement that from a gallon of the most suitable oil for the purpose, not more than 80 or 85 cubic feet of 50-candle gas can be obtained by any method of distillation. Whoever wants to use oil gas for carburetting purposes had better make his calculations upon this basis, in order to avoid risk of disappointment, although it is lower than Mr. Foulis's best. This means that at least one-half of the weight of oil put into the retort is left behind in the form of tar or carbon, and cannot be made available for the purposes of the gas maker. Closely as we have looked into this matter of gasifying oil, we cannot find that there is much difference in the results of the various ways of conducting the operation, so long as it is thoroughly done. It is quite immaterial whether the oil is carbonized in a retort or gasified in a water-gas generator. It makes about the same quantity and quality of gas in both cases; but a given weight of oil will make a better show when used to carburet coal gas, than when employed to impart illuminating power to water gas. Possibly the forthcoming Gas Institute papers of Messrs. Lewes and Foster may increase the available stock of information upon this subject.

For the present, it looks as if the best recourse for the gas manager bereft of his habitual assistant, cannel coal, is a specially-fitted retort or two in a bench, arranged to make oil gas *à la* Pintsch. The question of the precise spot at which the carburetting oil gas should enter the current of coal gas is not unimportant from one point of view, although it is immaterial in respect of the permanence of the gas if properly made. Inasmuch as in an exclusively oil-gas works there is the deposition of tar, and the gas has to be condensed, washed, and purified by lime, there is no reason why, in a coal-gas works, any small proportion of oil gas that happens to be made should not go through identically the same processes in company with the general stock.

It is rather a pity that the advantages of gasoline as a corrective of the quality of coal gas were not more pointedly explained at the recent Institution meeting, while carburetting methods were being discussed. In view of the thorough exposition that this branch of the subject received a few months ago at a meeting of the Southern District Association, it may have been considered unnecessary to bring the same matter forward again; but the fact remains that the remarkable extension of the use of gasoline in connection with the gas supply of London during the past twelve months is ample evidence in favour of this form of fluid hydrocarbon being regarded as the gas workers' friend. Make gas how we will, and bring up its quality as we may with cannel or oil, it is a far cry from the retort to the photometer, and "there's many a slip," which the most careful of retort-house foremen cannot always prevent, between the coal and the candles. Then is the opportunity for gasoline, which, when used in the proper and reasonable way now and for some time past, followed by Metropolitan gas managers, can be depended upon to carry its benefits through any tortuosities of mains and services, and make its influence felt where desired. Curiously enough—and the fact speaks loudly of the paramount importance of this matter—carburetting theories and carburetting processes furnish the only topic common to the programmes of both the Institution of Gas Engineers and the Gas Institute. What with one contribution and another, the subject ought to be very much advanced in point of *technique*, as a result of the present concentration of attention upon it.

Before leaving this subject, which in one aspect may be described as the comparison of oil with cannel as a carburetting material, it may be desirable to offer, for what it is worth, an explanation as to why British gas makers are driven to abandon cannel before their Continental brethren. It has been asked why, if it pays Continental gas companies to give the high prices demanded for good cannels, it should not pay British gas manufacturers to do the same. One reason for the tendency of the latter towards oil is the simple commercial one, that it is so much cheaper in this country than it is on the Continent, where it is loaded with heavy customs and other duties. Moreover, except in Russia, mineral oil is not produced upon the Continent; and the consideration of the duty is generally sufficient to deter any Continental gas company from thinking of petroleum in any form as a raw material for gas manufacture. The European customs dues upon lighting oil, which in some cases treble its cost to the user, have been based on the assumption that the commodity is to be consumed in small quantities in lamps; and it does not enter into the category of substances destined to be worked over in an internal manufacturing industry. Considerations of carriage also impel Continental gas companies to import the best English or Scotch coal, while they are about it; and their usually high selling price gives them a freer hand in purchasing than a British gas manager, who is cut down to the lowest possible margin.

TECHNICAL RECORD.

THE INCORPORATED GAS INSTITUTE.

Annual Report of the Council.

The following is the report of the Council of the above-named Institute, which will be presented at the meeting to be held in Carlisle next Tuesday:—

In presenting to the members the annual report for the session 1890-91, the Council have pleasure in stating that, as will already have been seen from the volume of Transactions for 1890, the resolutions passed by the members at the Ryde meeting authorizing the incorporation of the Institute, were satisfactorily carried out before the close of that year. The licence applied for was granted by the Board of Trade on the 7th of November; and a certificate of incorporation, bearing date the 11th of November, was thereupon obtained from the Registrar of Joint-Stock Companies. Although it is too soon to speak with certainty of the working of the Institute under its new rules, the Council look forward with confidence to the future; believing that the steps taken will result in not only increasing the efficiency of the Institute as a working body, but also in improving its position as a technical society.

In order to fulfil the requirements of the Companies' Acts under which the incorporation of the Institute has been effected, it was necessary that the first general meeting should be held within four months of the date of registration. This statutory meeting was accordingly held on the 20th of February last at the Westminster Palace Hotel, London; and a report of the proceedings which then took place was subsequently issued to the members. The Council feel sure that the members will unite with them in receiving with deep regret the announcement made at that meeting of the death of Mr. John A. Radcliffe, the Solicitor, whose experience and knowledge have been so well tested in connection with the recent remodelling of the Institute.

With respect to membership, the position of the Institute at the date of incorporation was as follows:—

Honorary members	20
Ordinary members	444
Extraordinary members	48
Associate members	27
Associates	65
	604

Few words are needed to point out the desirability of increasing these figures. The Council therefore trust that members will, collectively and individually, do what they can to promote the growth and efficiency of their Institute by obtaining new members, and by furthering its interests in every possible way.

At the last annual general meeting, thirty-six members were struck off the roll for non-payment of subscriptions; six gentlemen were elected or transferred to the class of members, four to that of associate members, and one to that of associates.

It is with much regret the Council announce the following losses by death:—

Amos Cranshaw	Tyldesley.
William Daley	Dunedin.
John Garlick	Kildwick.
C. L. Hartley	Middleton.
James Jowett	Great Grimsby.
Stephen Murray	Uttoxeter.
William Richardson	Birmingham.
Charles H. Terdrey	Tavistock.

With a view to increasing the professional utility of the Institute, the Council have had under consideration during the past session various schemes calculated to prove advantageous to the members generally. To deal more effectively with these matters, the following Committees were appointed: (1) A Publications Committee; (2) a Technical Committee; (3) a General Purposes Committee. Reports from two of these Committees have already been submitted to the Council, and various extracts therefrom are appended to this annual report. These extracts will serve to illustrate the practical nature of the work dealt with by the Committees, and will, it is hoped, show members how manifest is the desire of the Council to render the Institute of practical and business value, not only to the members, but to the gas industry generally. It will be noticed that amongst the matters referred to in these extracts are the following: The formation of a reference library, the labour question, and the taxation of so-called "stills" used in the manufacture of sulphate of ammonia. On these matters the Council endorse the views expressed in the reports; and, indeed, have already acted upon some of the suggestions made. It would be of service if members who can assist in respect to any of the points raised would kindly give the Committees the benefit of their experience, advice, and co-operation.

The list of donations appended to this report will show that the idea of a Reference Library, which was received with such favour at the Ryde meeting, has now assumed practical shape. The Council are glad to avail themselves of this opportunity of expressing to the several donors their warm thanks for these

presentations, and of bringing before the members generally the claims of the library for further contributions.

With regard to the financial position of the Institute, it may be mentioned that the accounts in connection with two important items—namely, the printing and binding of the Transactions, and the legal expenses relating to the incorporation of the Institute—were not rendered before the end of the year; and consequently no disbursements in respect thereto occurred during the period covered by the balance-sheet. These two items have therefore been entered as outstanding accounts, and the balance modified accordingly.

There is one item—namely, that of arrears—to which the Council think the attention of the members should be specially directed. If the members whose subscriptions are included in this item only realized the trouble and unnecessary expense thrown on the Institute by their forgetfulness and delay in remitting, the Council feel convinced that a very short time would suffice to effect a great diminution in the amount under this heading.

J. HEPWORTH, *President.*
WILLIAM LONGWORTH, *Hon. Secretary.*
W. H. HARVEY, *Secretary.*

[APPENDIX.]

Extracts from the Report of the Publications Committee.
(J. HEPWORTH, *Chairman.*)

With regard to the Reference Library, the desirability of forming which has already been affirmed by the Council, your Committee have taken into consideration (*a*) the character such a library should assume, and (*b*) the steps which may be taken to effect its formation.

With respect to the first point, the aim should be to make the library representative of all branches of literature bearing on gas matters. It should contain complete files of the more important technical periodicals (bound up for reference), transactions of societies, patent specifications, parliamentary returns, important trade catalogues, together with copies of all standard works, both early and modern, on subjects connected with the gas industry.

As steps towards the formation of the library, your Committee would suggest (*a*) the grant of an annual sum from the funds of the Institute; (*b*) the donation of some standard work from every new member on his election; (*c*) donations from existing members; (*d*) presentation copies from authors; and (*e*) exchanges from scientific societies, and technical journals. It might also be desirable from time to time to issue a circular to the members, soliciting donations and drawing attention to any special works which might be needed for rendering the Library more complete and serviceable.

The formation of a library, although only recently introduced, has received the approval of many members of the Institute; and valuable works have, on certain conditions, been already offered.

Extracts from the Report of the General Purposes Committee.
(W. A. VALON, *Chairman.*)

With respect to the labour question, upon which subject a correspondence has been submitted for consideration, your Committee are of opinion that, although the varying conditions and circumstances of labour which exist in different works preclude the fixing of a hard-and-fast standard of work and wages, the Institute will be serving the interest of its members by ventilating this matter as much as possible. If more latitude could be allowed to gas managers by their directors or committees, the difficulty of dealing with this matter would, in many cases, be much lessened. Your Committee would recommend that a paper should, if possible, be obtained upon this important subject for reading and discussion at a meeting of the Institute, so that members may be afforded an opportunity of expressing their views thereon. Suggestions might thus be elicited sufficiently practical to afford ground for further action. Your Committee are glad to see that the Government have decided to appoint a Royal Commission to inquire into the labour question. They are of opinion that it would be an advantage if this inquiry could be made to include the gas industry; and they would accordingly suggest to the Council the advisability of taking this matter into consideration, with a view to deciding what action, if any, could be taken.

A correspondence, bearing date December last, has recently been submitted to your Committee, having for its subject the action of the Inland Revenue Department in seeking to bring sulphate of ammonia works under a clause in the Act of Parliament, 9 & 10 Vict., cap. xc., which makes it compulsory that a still licence should be taken out, at a cost of 10s. After careful perusal of the correspondence, and from the result of inquiries made in other directions, your Committee are of opinion that, although the Inland Revenue Department may perhaps be seeking simply the prevention of any possible infringement of the Act by charging a nominal fee for registration, such action on their part is a straining of the law which was never intended, as may, in their opinion, be clearly seen from clause 4 of the same Act. They think that the matter is hardly one which the Institute could, under present circumstances, be expected to raise in a Court of Law, and pursue to a definite decision, inasmuch as such a course would involve the Institute in a large and indefinite outlay from funds which would hardly warrant such expenditure; but they would suggest to the Council the advisability of obtaining the opinion of counsel upon this matter, with a view to publishing the same for the benefit of the members generally. Many of the members are sulphate manufacturers, and would doubtless be glad to be put into possession of legal opinion on a matter so pertinent to their industry.

[Lists of the presentations to the library, and of the cash donations promised and received, follow]

Mr. J. A. Harris, Manager of the Great Wigston Gas Company, has just completed extensions and additions to his manufacturing and distributing plant to the amount of about £6000, for which he has not only received the congratulations of his Directors, but an advance of £27 per annum in his salary. The works may now be regarded as in a thoroughly efficient condition; and as the great increase in consumption of gas which has lately taken place is likely to continue, their productive power will, no doubt, be fully tested.

Siemens's New Gas-Lamp.—Mr. F. Siemens has just brought out a new variety of his "Cineraria" type of recuperative gas-lamps. In this novelty the gas-flame (which has somewhat the aspect of an Argand flame, of which the separate jets are apparent, although united to each other round the edges of the burner) burns from the centre outwards. In the older form of these "Cineraria" lamps, the gas burnt the reverse way—the chimney being inside the ring of the burner, and the flame accordingly being made to turn inwards. Both varieties of these lamps give a most brilliant light; the contour and general appearance of the flames being very striking. The duty obtained from the gas burnt is extremely high; and not the least recommendation of the lamps is their exceptional cleanliness and durability. The new form of lamp has a very short body for a recuperative burner; thus enabling it to be fixed in interiors with low ceilings. It resembles the others in having nothing to get out of order or require renewal—sources of vexation and expense to the users of some descriptions of recuperative lamps. Mr. Siemens has also perfected his unique flat-flame recuperative lamp, which yields perhaps the highest duty of any similar apparatus, but has not attracted much favour in this country on account of its somewhat odd appearance. As now made, this lamp looks much neater and more compact, without sacrificing its efficiency.

Issue of Further Capital by the Commercial Gas Company.—In pursuance of the resolution passed at the ordinary general meeting of the Commercial Gas Company on the 3rd of April last, authorizing the raising of additional capital by the issue of new ordinary stock to the amount of £35,000, the Directors have determined to proceed with the issue forthwith. Letters of allotment, dated the 23rd of May, have been sent out, offering the stock to the registered proprietors in rateable proportion to the amount of their holdings of stock on that date. The proportion offered is £1 of the new issue for every £20 of stock then held; and the allotments must be accepted and paid up in full not later than the 1st of July next. By the terms of the Company's Act of Parliament, this new stock carries a standard dividend of 7 per cent., which may be increased or diminished by the sliding scale; the last dividend declared upon the existing issue of similar stock was at the rate of 10¾ per cent. The Commercial Company stand alone, among gas companies working under the sliding scale, in the enjoyment of the privilege of issuing capital at par among the proprietors. The Company obtained their sliding-scale Act and their additional capital powers in 1875. In the session of the next year, when the other two Metropolitan Companies went to Parliament, auction clauses were introduced; and so they have continued to be since then. But the privilege of issuing further capital at par is also a source of danger; there is the temptation to exercise the power when stock is at a high premium. It is greatly to the credit of the Directors of the Commercial Company, as we pointed out when commenting on the Company's affairs in the JOURNAL for April 7 last, that, so far from approaching the shadow of a liberal exercise of this power, they have rather gone to the other extreme, and have deferred, as long as they well could, the creation of any addition to the capital of the undertaking. It is eleven years since any of the new stock was issued; and five years since any capital was raised on debenture stock. The moneys thus provided were exhausted some two years ago by the growth of business. But rather than resort to the raising of further capital, the Directors have boldly looked an overdrawn capital account in the face; and, by the aid of good working balances in hand and of temporary accommodation from their bankers, they have shown themselves excellent financiers. However, a time necessarily comes when additional capital must be had; and come it has. But the extra burden thus charged upon the undertaking is not heavy; amounting as it does to only about 3s. 3d. per ton of coal carbonized. This will bring the total capital per ton carbonized up to no more than £3 17s.—a charge which will compare very favourably with the average of other companies. It may also be reasonably expected that the new issue will suffice to answer the requirements of the Company for some years to come, and that the total capital upon which dividends have to be earned will thus remain so long at its present satisfactory ratio.

BUENOS AYRES CO-OPERATIVE GAS-WORKS.

The plate which accompanies the JOURNAL to-day is the last of the series of drawings we have been issuing of the above-named works. It shows in elevation and section one of the two gasholders, some particulars respecting which are given in the following extracts from the specification :—

Inner Lifts of Gasholders.

The crowns of the gasholders to have a rise in the centre of 6 feet, and to be made to the form of a true segment of a sphere.

Crown Plates.—There shall be one centre crown plate in each holder, made of ¼-inch steel plate 6 feet in diameter.

Top Curbs.—The top curbs to consist of one outer ring of 6 in. by 6 in. by ¾ in. steel angle-iron, and one inner ring of 6 in. by 9 in. by ¾ in. steel angle-iron; also a ring of steel plates ½ inch thick by 2 ft. 9 in. wide, rivetted to the angle-irons as shown in the drawings. The angle-iron rings to be in 16 pieces of equal length, joined by angle-iron cover pieces of the same section 2 feet long. The angle-iron cover pieces to be riveted with ¾-inch rivets in double row zigzag, 2-inch pitch. The ½-inch steel plates to be riveted with ¾-inch rivets 2-inch pitch. The riveting to the angle-iron curbs to be in double row zigzag.

Vertical Stays.—There shall be 32 vertical stays, composed of ¼-inch steel plates and 2½ in. by 2½ in. by ⅜ in. angle-irons, in the form of H girders. The stays to be 1 foot wide, except at the top, where they are to curve out to a width of 2 feet, and are to be riveted to the angle-iron curbs, and to the ½-inch steel curb-plates with ¾-inch rivets. The vertical stays shall descend below the hydraulic cup 6 inches. The angle-irons of the stays to be riveted with ⅝-inch rivets 4-inch pitch; and the stays to be riveted to the hydraulic cup by six ¾-inch rivets.

Hydraulic Cup.—The hydraulic cup to be made of ⅜-inch steel plates, bent round in semicircular form, and riveted together with ¾-inch rivets. The cup to be 2 feet deep and 10 inches wide. A bead of 2½ in. by ¾ in. half-round iron to be riveted round the outer edge with ¾-inch rivets 6-inch pitch. There shall be 32 cast-iron rest-blocks fixed at equal distances inside bend of the cup with ¾-inch rivets having countersunk heads.

Crown Sheeting.—The crown sheeting to consist of 12 rows, each 4 ft. 5 in. wide measured on the plan. The first row next the ½-inch steel curb-plates to be ¼ inch thick; the second row and the row next the crown plate to be of No. 8 B.W.G. thickness; and the intermediate rows of No. 11 B.W.G. The first row of ½-inch sheets to be riveted to the ½-inch steel curb plates with ⅝-inch rivets, and to the second row of sheets with ½-inch rivets. The second and third rows to be riveted with ⅝-inch rivets. The row next the crown plate to be riveted with ½-inch rivets to the crown plate, and with ⅜-inch rivets to the next row. All the other rows of crown sheets to be riveted with ½-inch rivets.

Side Sheeting.—The top row of side sheets to be ½-inch thick; the second row and the row next the hydraulic cup to be of No. 8 B.W.G. thickness; and all the intermediate rows of No. 11 B.W.G. thickness. The top row to be riveted to the top curb with ¾-inch rivets in double row zigzag, 2-inch pitch; the second row to be riveted with ½-inch rivets; and the third row and the row next but one to the cup, with ⅝-inch rivets. The row next to the hydraulic cup to be riveted to the cup with ⅝-inch rivets. All the intermediate rows to be riveted with ½-inch rivets. The pitch and lap to be the same as indicated for the crown sheeting.

Outer Lifts of Gasholders.

Bottom Curbs.—The bottom curbs to consist of two rings of 5 in. by 5-in. by ⅝-in. steel angle-iron, set in contrary directions. The distance apart from outside to outside of the flanges to be 1 foot. Each ring of angle-iron to be in 16 pieces of equal length, joined by cover pieces of 4½ in. by 4½ in. by ¾ in. angle-iron 2 feet long. The joints of one ring to be situated midway between the joints of the other ring. The joints to be riveted with ⅞-inch rivets 3 inches apart.

Vertical Guides.—There shall be 32 vertical guides composed of 8 in. by 2½ in. by ½ in. channel-iron. They shall be riveted to the bottom curb by four, and to the hydraulic grip by six ¾-inch rivets, with countersunk heads.

Sheeting.—The row of sheets next the hydraulic grip and the row next the bottom curb to be of No. 8 B.W.G. thickness, and the intermediate rows of No. 11 B.W.G. The row next the hydraulic grip to be riveted with ½-inch rivets, and that and the next row with ⅝-inch rivets. The bottom row to be riveted to the bottom curbs with ⅝-inch rivets, one row in each angle-iron, 4-inch pitch. The bottom row and the next row to be riveted with ⅝-inch rivets, and the intermediate rows with ½-inch rivets.

The guide-framing of the holders consists of cast-iron columns and wrought-iron lattice girders. The columns are 69 feet high. They were made in four lengths, exclusive of the bases and the terminals. They were cast with internal flanges which were faced in a lathe, and connected together by bolts inserted from inside the columns.

The girders are 4 feet and 3 ft. 6 in. deep respectively, with double sets of lattice bars; the principal series being 2½-inch and the secondary series 1½-inch flat iron ⅜ inch thick.

The contract for the ironwork was carried out by Messrs. Newton, Chambers, and Co., Limited, who supplied and erected the whole of the plant and machinery.

Metropolitan Water Companies' Accounts.—The accounts of the Metropolitan Water Companies, made up respectively to Sept. 31 and Dec. 31, 1890, have been presented to Parliament in continuation of previous returns.

Mr. E. G. Clayton F.I.C., F.C.S., who was appointed a year ago by the Coventry City Council to make independent tests for twelve months of the gas distributed from the Corporation Gas-Works, was last Tuesday reappointed permanently.

Water Gas in France.—In the clock-making village of St. Nicolas, near Dieppe, Mr. Albert Hoster, of London, some four or five years ago established extensive works for the manufacture of all kinds of electrical apparatus. As the place was without gas, Mr. Hoster set up complete water-gas, plant which is reported to be working admirably.

Mr. J. J. Lyne, late of Inchicore (Dublin), has been appointed assistant to Mr. John Lyne, Engineer and Secretary of the Wexford Gas Company, in place of his brother, Mr. Henry Lyne, who, as already announced, succeeds Mr. Gregan in the management of the Carlow Gas-Works. In noticing Mr. H. Lyne's appointment last week, we should have stated that he was Assistant-Engineer, not Engineer and Secretary, at Wexford; his father continuing to fill this position. Attention is called to this, as several letters have been addressed to Wexford on the matter.

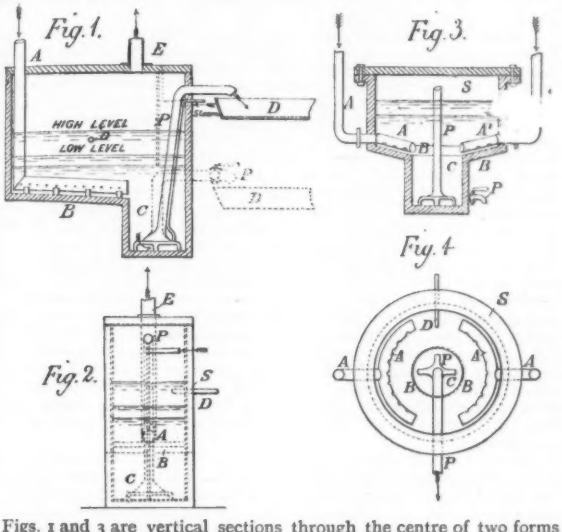
The Chemistry of Illuminating Gas.—Our readers will see, by an advertisement which appears elsewhere, that the series of articles on the above subject which were contributed to the JOURNAL, in the period extending from January, 1889, to February, 1891, by Mr. Norton H. Humphrys, Assoc. M. Inst. C.E., F.C.S., have been reprinted in book form. The matter composing the volume constitutes a record of the various gas-making processes which have been described from time to time in our columns; and in the shape in which it is now presented it will be found more convenient for reference, by students and others who are interested in the questions dealt with, than it was when scattered over our pages.

Manchester District Institution of Gas Engineers.—Saturday last proved an exceptionally fine day; and the forty or fifty gentlemen who attended the May meeting of the Manchester District Institution of Gas Engineers had an exceedingly enjoyable excursion. Beeston Castle, an ancient ruined fortress, some ten miles from Chester, was the ultimate point of a journey which proved most interesting in every respect. The castle is situated in the midst of some of the loveliest scenery of which Cheshire can boast, and has moreover that old-world charm peculiar to remains of its class. The rendezvous was the Central Station, Manchester, where there was a large muster. A special saloon and other carriages were reserved for the party, whose number was augmented *en route*. After a journey of a little more than an hour, Cuddington was reached. Vehicles were here awaiting the party; and they set off for a drive through Delamere Forest to Tarporley. This portion of the day's proceedings was delightful; and the fresh air lent zest to the appetites of the excursionists, who were not at all sorry to find a capital luncheon awaiting them at the Swan Hotel—an ancient hostelry well in keeping with its surroundings. A further drive of two or three miles brought them then to Beeston Castle, where an hour or two passed in lounging about the ruins. Excellent time was kept throughout the day; and punctually to the minute everybody was back at the Swan Inn to tea. The day was set apart for pleasure; and the business transacted was of the least possible quantity. With the President (Mr. T. O. Paterson, of Birkenhead) in the chair, the minutes of the last meeting, held at Manchester on Feb. 20 last, were confirmed, and then the names of three new members were submitted. These were Mr. H. H. Ford, acting Manager of the Macclesfield Gas-Works; Mr. R. Fearnley, of Rastrick; and Mr. S. Crossland, of Holmfirth. They had been duly proposed, and had been accepted by the Committee; and on the motion of Mr. D. Clarke, of Ashton-under-Lyne, seconded by Mr. W. W. Hutchinson, of Barnsley, their election was confirmed. The Secretary (Mr. S. S. Mellor) referred to some letters of apology received from absent members who had other engagements, or were through illness or other cause unable to attend. Afterwards arrangements were made for the journey of the Manchester District members to the forthcoming meeting of The Gas Institute at Carlisle. Thanks were accorded to the caterers for their attention to the party; and on the proposition of Mr. Hutchinson, seconded by Mr. Newbigging, hearty appreciation was expressed of the arrangements made by the President, the Secretary, and Mr. Haddock, of Warrington, for the comfort of the party. Another delightful drive by a new and longer route, which afforded equally charming views of the scenery, brought the members back to the station, and the journey by train to Manchester was the final incident of a day which will long be remembered.

REGISTER OF PATENTS.

Sulphate of Ammonia Saturators.—Wilton, Thomas, of Beckton. No. 5205; April 3, 1890. [8d.]

This invention relates to a saturator for use in the manufacture of sulphate of ammonia, consisting of a perfectly closed vessel, in which the ammonia discharge is arranged at such a level that sufficient cubical space intervenes between this level and the lowest parts to contain all the deposited salts, from which they may be discharged by gravity or otherwise.



Figs. 1 and 3 are vertical sections through the centre of two forms of saturators. Fig. 2 is a front elevation of fig. 1. Fig. 4 is a plan of fig. 3 with the cover removed.

The patentee proposes to employ a closed vessel S, either square or rectangular; and into it the ammonia-supply pipes A are led, while the discharge is arranged at such a level that ample cubical space (in proportion to the capacity of the plant) intervenes between the level of the discharge and the lowest part of the vessel. For this purpose, it is convenient to make the saturator of inverted ⅂ or T shape, with the vertical member forming a depositing chamber or well C, towards which the base B of the upper part is, or may with advantage be, inclined. The ammonia-pipes A inside the saturator may be either straight or curved according to circumstances, and made to follow the inclines of the base B, and provided with the usual discharging orifices. The acid-pipe D and the escape-pipe E for waste gases may be arranged at any convenient points.

The object of this arrangement is to ensure the circulation of more or less clear liquid in the neighbourhood of the ammonia discharge, while the deposit will all take place below, and clear of it; and thus prevent any clogging of the ammonia discharge orifices. The capacity of the depositing chamber C must be sufficient to receive and contain all the salts that are deposited—it may bear a proportion to that of the vessel S (roughly) of about 1 to 3.

The salts deposited in the chamber C may be discharged therefrom by gravity through an ordinary blow-off pipe and tap placed at or near the base, as indicated at P; but, by this arrangement, a certain quantity of the "mother liquor" is discharged with the salt, which has to be raised and returned to the saturator. To obviate the raising, it is found better to lift and discharge the salts at a higher level—say, about 2 feet above the general level of the acid, so that any liquor can drain back into the saturator by gravity. This can be accomplished by the use of the automatic discharger described in patent No. 19,225 of 1889, arranged as shown at P, and discharging into the drainer D.

By this arrangement (says the patentee) one saturator will suffice for four open trough saturators of the same capacity, and constructed in the usual manner, for the following reasons: The vessel S being perfectly closed, no splashing over of the liquids can take place, neither can noxious fumes escape into the atmosphere about the saturator; neither need any stoppage or change take place; and no manual labour is required either during the manufacture or the discharge of the sulphate.

In practice, a similar result might be obtained by leaving the top parts of the front of the vessel S open, so as to form an open trough, and applying the usual fixed curtain, as shown dotted in fig. 1. But there is no advantage in this construction, the patentee remarks, while the present grave disadvantages of splashing over and the escape of noxious fumes remain; and such a construction would be practically no improvement on what had gone before.

Gas-Engines.—Dawson, H. T., of Salcombe, Devon. No. 6407; April 26, 1890. [1s. 1d.]

This gas-engine has four stages in its cycle of action—(1) the cylinder takes its charge during the outward movement of the piston; (2) the charge is compressed by the return of the piston; (3) the charge is fired, and the effective outward movement of the piston takes place; and (4) the products of combustion are discharged while the piston returns. This cycle is attained without the use of valves or slides; the piston itself operating as valves.

The engine has a piston which, besides reciprocating, entirely revolves once for each cycle of the engine. It is practically a tube about twice the length of the stroke, fitting well to the cylinder in which it works. The cylinder is fitted with rings, kept out of contact with the piston by a wedge or lever arrangement, worked by a cam, so that the rings give an intermittent pressure upon the piston, lasting while the gaseous pressure is high, and leaving the piston free from the friction of the rings at all other times. The piston tube is closed by a diaphragm, about one-fourth of its length from the outer end of the tube. The cylinder is about three times as long as the stroke, with long ports about its centre part, extending spirally for about the length of the stroke or rather less. The connecting-rod at its outer end embraces the crank-pin; and at its inner end it terminates in a ball, which is received into a socket upon the diaphragm of the piston, so that it may revolve freely while it also reciprocates. Upon the connecting-rod, there is a sleeve carrying a bevel wheel at its outer end, gearing in a pinion fixed upon the crank-pin. At the inner end of the sleeve is an arm connected by a link with the piston. There are ball joints at the ends of the link. The piston has an aperture through its tubular part, about the centre of its length, serving for all the purposes of admission, ignition, and exhaust. It is carried successively over the several ports in the cylinder. The cover or end of the cylinder is made to extend into the tubular piston, so as to leave only a proper space for compressing the charge. The cover contains water; and water passages are formed upon the cylinder—the whole being in connection with a cistern or other water supply. The inner face of the piston diaphragm is firmly covered with asbestos or other non-conducting material, to protect it from the burning charges.

In order to govern the speed of the engine, a gas and air valve is fitted upon the cylinder outside the admission port. This valve closes both gas and air passages at once (the passages being conveniently concentric); and the valve is so constructed as to pass nearly constant proportions of gas and air at the different lifts allowed to the valve. The governor limits or prevents the rise of the valve when the engine attains its proper speed; and control of the governor over the gas and air valve is obtained by moving a wedge or other stop over the spindle of the valve, so as to limit its rise. Ignition is gained by means of a heated small thin tube or capsule enclosed in a small furnace lined with refractory non-conducting material. The outer end of the tube is closed; while at its end next the cylinder it is fitted into a plate or washer, reduced in thickness around the tube, so as to stop the conduction of heat from the tube as much as possible. A current of mixed gas and air is forced into the furnace close to the cylinder, through wire gauze or otherwise, so as to give a strong combustion in the furnace; and a small passage is provided leading from the inner end of the ignition-tube to the open air, for clearing the products of combustion which might otherwise interfere with the ignition. This clearing passage may be closed upon explosion by an automatic valve; or the passage may lead to the cylinder bore, and a port in the piston tube outside its diaphragm may be brought to coincide with this passage at the proper moment. The jet of air for forcing the furnace is supplied by a small pump worked by the engine from an eccentric acting on a slotted lever, so arranged that, by shifting the fulcrum, the stroke can be varied. The air is heated before it feeds the flame, by waste heat from the furnace.

The action of the engine is as follows: 1. During the first outward stroke, the port in the piston coincides with the cylinder admission port, and gas and air fill the cylinder. At the end of the outstroke, the piston, by a further revolution, cuts off the admission. 2. Compression takes place during the whole of the next instroke. 3. At or immediately before the commencement of the next outstroke, the movement of the piston opens the port therein to the ignition-tube. Explosion ensues; and work is done during the whole of the outstroke. 4. At or immediately before the end of the outstroke, the port in the piston opens to the exhaust port in the cylinder, and remains open during the whole of the return stroke.

Manufacture of Illuminating Gas.—Lindsay, R. C., of Hampstead. No. 7252; May 9, 1890. [1s. 1d.]

In this process, says the patentee, any kind of gas coal or cannel or other gas-making material may be used; the coal being first carbonized in a retort—by preference inclined. The gas, in the first instance is led away through an ordinary hydraulic main to a condenser and washer, where the tar and aqueous vapours are removed, and thence into an exhauster for further manipulation. Before withdrawing the hot coke from the gas-making retort, steam is admitted. This is decomposed in the first instance, while the retort is very hot—forming carbonic oxide and hydrogen; while later, as the retort cools, carbonic acid and hydrogen are formed. This keeps the retorts free from deposited carbon, and at the same time increases the quantity of sulphur as well as ammonia in the gas. The increase of sulphur (objectionable in ordinary gas making) is no objection in this process, as the total sulphur, less that contained in the gas used in firing the furnace, has to be removed from the gas before storing in the holder.

The coke resulting from this carbonization is withdrawn from the retort hot and placed in a second series of retorts, where it is brought in contact with superheated steam. The second series of retorts are in batteries of two, in the first of which the steam is decomposed—forming principally carbonic acid and hydrogen. This imperfect water gas is further superheated before being passed through the second water-gas retort, where the carbonic acid is converted into carbonic oxide. This gas is subject to further manipulation. The retorts are placed four in a bench for carbonizing with four water-gas retorts worked in pairs. The water-gas retorts have each two smaller fire-clay pipes for the purpose of superheating, first, the steam used in the first retort, and, second, the imperfect water gas produced therein previous to its passage into the second retort, where it is converted into perfect water gas. The reason for making water gas in two stages is because the superheated steam is decomposed at a much lower temperature than carbonic acid; the carbonic acid being subsequently superheated to facilitate its conversion into carbonic oxide.

The hydrogen required is produced in special upright retorts (one in each end of the furnace), fitted with iron trays filled with spongy iron; while the gas produced is ultimately carburetted to any desired degree of luminosity in three or more retorts or chambers placed horizontally in the furnace.

All the retorts, superheating pipes, carburetting chambers, and hydrogen producing retorts are arranged in an oblong furnace of suit-

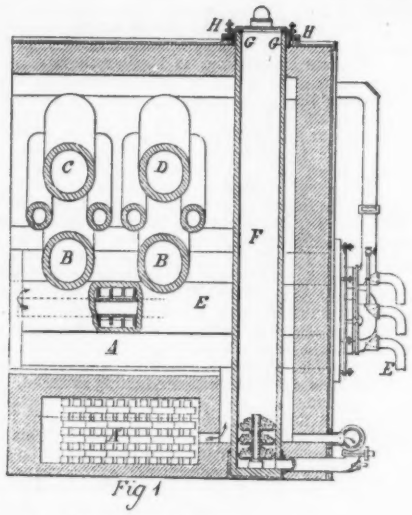


Fig 1

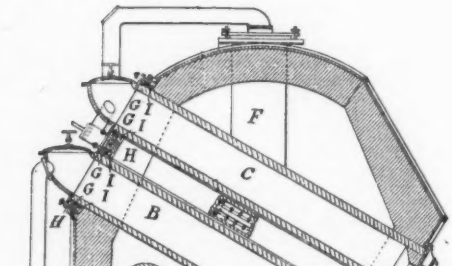


Fig. 2.

able dimensions. One end of the inclined retorts and superheater pipe comes through the side of the roof of the furnace; the lower ends of the retorts coming out through the front of the furnace, while the lower end of the superheater pipes communicates with the lower end of the water-gas retorts. Both ends of the retorts are provided with charging and discharging doors.

This furnace is, by preference, a gas-fired furnace, fitted with regenerators and reversing valve for air only; the gas being a waste gas hot from the hydrogen producers. The superheating pipes are fitted with fire-clay or porcelain baffling-plates, to increase their efficiency as a superheater. The furnace has also three or more carburetting retorts, also fitted with baffling-plates to increase their efficiency. Within each end of the furnace is an upright fire-clay retort, fitted with iron trays to contain the spongy iron used to produce hydrogen by decomposition with superheated steam. By this means the percentage of carbonic oxide in the gas is kept down. The iron within the retort is alternately oxidized by steam, producing hydrogen, and then reduced to a metallic state by water gas. The partially exhausted water gas is then used to maintain the heat in the furnace, burning with the hot air from the regenerator. The gas produced in the first carbonization of the coal is delivered under pressure by an exhauster back to the retort-bench, where it is divided into six or more parts, and used in six or more jets, one in each end of the carburetters, of which there are three at each end of the furnace to draw the water gas from the water-gas retorts.

It is important that this coal gas should be cleansed, as described, as a great waste of hydrocarbon would subsequently take place in the carburetting process caused by the decomposition of the aqueous vapour, the effect of which is to destroy the hydrocarbon used. The water gas is carbonic oxide and hydrogen mixed with the hydrogen produced by decomposition of the superheated steam with the spongy iron, as described; and it is forced by these jets through pipes in the centre of the carburetting retorts from each end to near the middle of the same, where it then returns, and finds its way to the outside ends of the carburetter, coming in contact with the baffle-plates with which the retorts are fitted. The jets of water gas serve to draw a supply of heavy petroleum oil, or the like, into the carburetters, where it is carried along in spray or vapour with the gas in its passage through them. The carburetting is done in three or more stages. In the first place, the total water gas and hydrogen with one-third (more or less) of the ordinary gas produced in the first carbonization of the coal or other material will be carburetted up to a certain point in the first carburetter; a sufficient quantity of hydrocarbon oil or tar being added for that purpose. A second one-third of the ordinary gas acting as a jet, as described, under a slight pressure from the exhauster, forces the gas from the first carburetter through the second carburetter; additional hydrocarbon oil or tar being here drawn in as described. The last portion of the ordinary gas, acting as a jet, forces the gas from the second carburetter again through the third carburetter, into which also the hydrocarbon oil is drawn. By thus dividing the carburetting into three or more parts, and adding the carburetting material in three or more stages, gas of any desired luminosity can be made with only a small amount of carburetting material. The gas, after passing through the last carburetter, will be led away to coolers, scrubbers, and purifiers, and thence to the holder in the ordinary way.

Fig. 1 is half a front view of the apparatus; and fig. 2 is a section through the retorts C B of fig. 1.

A indicates the interior of the furnace; A^1 being the air regenerator. B are the four retorts used for carbonizing the coal in the first instance—fitted with doors bottom and top. A steam-pipe is connected with the lower ends of the retorts, for the purpose of admitting steam into them for cooling the coke. The gas from these retorts is drawn off into the hydraulic main; the end dipping into the liquid to form a seal. C are the two water-gas retorts, in which a portion of the coke from the retorts B is placed; these retorts also being provided with doors bottom and top. Steam is admitted into these retorts from steam-pipes fitted in the heads of the superheating pipes, through which it passes and enters the retorts at the bottom. The superheating-pipes are fitted with baffling-plates, arranged round a central rod; so that the steam is caused to take a tortuous course in flowing through them. The water gas from the retorts C passes out through the pipes in the head of the retorts, and into the superheaters, which have similar baffle-plates. The gas now passes into the retorts D, which are charged with a portion of the coke from the retorts B, and where it is formed into a fixed gas. The retorts D are provided with doors bottom and top. From these the gas passes into the horizontal carburetting retorts E; being joined by a current of gas from the vertical hydrogen retort F (hereafter described), though it may also pass down into the retort F itself, when the generation of hydrogen is not taking place. The carburetters E are fitted with doors to receive the various pipe connections.

The pipe which carries the gas passes into the first retort at the same point as the washed illuminating gas, which has been made in the retort B, and which is delivered under pressure from the exhauster and passes into the carburetter, through the nozzle shown—drawing with it the gas, and also a proportion of a heavy carburetting oil delivered in the form of spray or vapour. The carburetter is fitted with a porcelain or metal tube having baffle-plates arranged round same. The gas and carburetting material pass through the tube E, and out at the end of it, as shown by the arrows in fig. 1; returning past the baffle-plates so as to enable it to take up a proportion of the oil. It then passes out into the second retort E, into which it is forced by another jet of illuminating gas from a further pipe, which draws in at the same time a proportion of oil from another branch pipe; passes through the retort and out into the third retort, where it is also met by a further jet of gas, which forces it in, together with more oil; and after passing through the retort, the finished gas travels to the usual coolers, scrubber, and purifiers. The same operation takes place with the carburetters at the other end of the furnace.

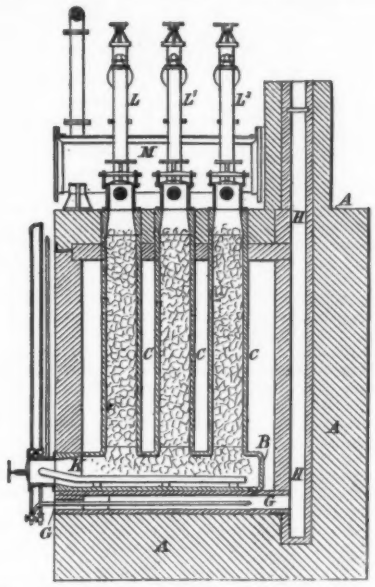
The hydrogen required is produced in the vertical retort F, which is fitted with perforated iron trays, holding spongy iron, scrap, or the like. Steam is led to this retort during the time that hydrogen is being manufactured; the hydrogen passing out at the top of the retort as described. As soon as the steam is shut off (which is done by a valve not shown), the fixed water gas from the retort D enters the retort F, reconverting the iron oxide formed by the hydrogen-making process into metallic iron, and passes out through passages into the furnace A, meeting at the same time the stream of air from the regenerators.

It will be understood that the operation of making hydrogen and reconverting the oxide of iron and firing the furnace is alternated at either end; one of the valves being closed when hydrogen is not being produced. It is preferred to carry one end of all the inclined vertical and horizontal retorts in the manner shown in fig. 1, in which it will be seen that one end is formed of a casting G, having a sleeve portion and a flange with which bolts H engage; these bolts having springs interposed between their nuts and the flange, to enable the retort to expand and contract. The other ends of the bolts are held by the furnace-casing, in which at a point around the sleeves are placed pipes I, in which water is caused to circulate so as to keep the ends of the retorts cool, and prevent them expanding.

Manufacture of Illuminating Gas.—Pitt, S.; communicated from E. J. Jerzmanoski, of New York. No. 8535; June 2, 1890. [8d.]

This invention relates to apparatus for the manufacture of illuminating gas by the action of lime on steam and hydrocarbon (by preference liquid) in one combined retort and in one combined operation. The combined generating and fixing retort is charged with a body of, by preference, limestone, burning it to quicklime, and then utilizing this lime for breaking up the steam and liquid hydrocarbon into illuminating gas and small percentages of carbonic acid and carbonic oxide; sufficient illuminant being used to make an illuminating gas which is fixed in other branches of the retort.

The apparatus (duplicated) is enclosed in a suitable casing A. It consists of two combined fire-clay retorts having each a horizontal portion B and vertical portions C, made separate, and fitted to the horizontal portion. The retorts are filled with common limestone, which preferably may contain some clay. In the bottom of the horizontal retorts, pipes K are fitted, by means of which steam and hydrocarbon are injected into the horizontal parts of the retorts. The retorts are heated by a furnace, the heat of which passes up centrally into the space between the series of vertical retorts, then horizontally, and descends in an exterior chamber, thence passing into the longitudinal chambers G, and escaping therefrom through the chimneys H. Within the chamber G a superheating pipe is arranged. The steam and oil are supplied to the bottom of the retorts by the pipes shown, or oil may be injected directly into the pipe K through an injector without superheating the oil. The upper ends of the vertical retorts communicate with the three pipes L, L^1, L^2, passing to the hydraulic main M through automatic pressure regulators.



To start the process, a fire is kindled in the furnace; and the retorts are heated, thereby burning the limestone to caustic lime. Thereafter the steam and oil or liquid hydrocarbon (by preference naphtha) being admitted to the pipe K provided with perforations on its under side, the steam and oil are converted principally into illuminating gas with a small percentage of carbonic acid and carbonic oxide; sufficient illuminant being present to make an illuminating gas of the quality desired. The gas is tested at frequent intervals; and the admission of oil or hydrocarbon is regulated accordingly. The conversion occurs in the lower retort B; the vertical retort C serving to finally fix the illuminant.

APPLICATIONS FOR LETTERS PATENT.

8039.—LINDLEY, R. H. N., "Wheel valves for steam, gas, or liquids." May 11.

8040.—OLDMEADOW, J., "Improvements in gas-reflecting lamps; the new Victoria gas-light." May 11.

8067.—KEETMAN, T., and BACH, W., "Apparatus for charging and discharging gas-retorts and other vessels." May 11.

8068.—KEETMAN, T., and BACH, W., "Scoop for discharging gas-retorts." May 11.

8069.—CAPITAINE, E., "Improvements in gas motors." May 11.

8180.—BROWN, A. O., "Improvements in regenerative gas-lamps." May 13.

8208.—PICKFORD, R., "A gas-light ventilator and reflector that can be raised or lowered from ceiling to light where required." May 13.

8288.—GREEN, H., "Apparatus applicable to gas and other meters, for arresting the same when a determined quantity of gas or other fluid has passed." May 14.

8444.—COWAN, W., "Improvements in prepayment gas-meters." May 16.

8469.—ABEL, C. D., "Improvements in gas and oil motor engines." A communication from the Gas Motoren Fabrik Deutz. May 16.

8479.—RUSCOE, J., "Improvements in apparatus for charging and drawing gas-retorts." May 16.

8598.—PEEBLES, D. B., "Improvements in gas-governors." May 20.

8606.—JUSTICE, P. M., "Improvements in and connected with water or liquid meters." A communication from the Thompson Meter Company. May 20.

8607.—CUTTRISS, T., "Improvements in gas-engines." May 20.

8649.—TYLOR, J. J., "Improved apparatus for regulating and limiting the supply of water from water-mains to service-pipes." May 20.

8652.—NICHOLS, G. B., and MARCH, W., "Improvements in gas locomotives for drawing tramcars and railway carriages as they are at present constructed." May 20.

8705.—DONNELLY, J., "Improvements in gas welding appliances." May 21.

8771.—READ, J. C. C., "Improvements in air-spreaders for Argand burners, applicable for use with oil or gas." May 23.

Stafford Corporation Gas Undertaking.—Last Thursday an inquiry was held at Stafford by Colonel Ducat, R.E., Inspector of the Local Government Board, relative to the application of the Corporation for power to borrow £20,000 for the extension of the gas-works. The Town Clerk (Mr. F. M. Blakiston) stated that the greatly increased consumption of gas was mainly owing to the policy of the Corporation in supplying about 700 houses on the fortnightly payment system. They had now about 700 of these consumers on the books, and applications for 100 more to be connected as soon as possible. A little extra was charged for the expense of collecting; but he believed it was satisfactory to the consumers, and remunerative to the Corporation. The manufacturing capacity of the works at the time they were taken over was about 400,000 cubic feet per twenty-four hours; and now it had reached 560,000 feet; and when the money now applied for was expended, the producing power would be increased to a million cubic feet. As to the future, they did not fear the competition of electric light, and had actually obtained a Provisional Order to supply it; but, from statistics they had obtained, it was not wanted in the town at present. A number of plans were submitted of the proposed extension. There was no opposition.

CORRESPONDENCE.

[We are not responsible for opinions expressed by correspondents.]

Mr. Grafton on the Standard of Light.

SIR,—I have read with much interest Mr. Grafton's paper on "Candles," which has recently appeared in your columns; and, having given considerable attention to the subject, I shall be glad if you will permit me to make some remarks upon it.

Mr. Grafton does not state whether gas of constant quality was used in the experiments given in Tables I. to III. It would appear, however, by his stating particularly that the gas was *not* of constant quality in the experiments in Table IV., that the gas used in the others was uniform in illuminating power. This is all-important; as, if gas of varying quality was used, the results lose much of their value. If the same gas was used in all the experiments, I should like to know what means were taken to ascertain that its quality did not vary during any of the series.

Assuming that they are strictly comparable, Mr. Grafton's results afford strong evidence in favour of "B" as the best shape for obtaining uniform results, and consequently the nearest approach to a "standard." The only objection Mr. Grafton can find to it is really that it produces the maximum light from the sperm consumed. Instead of an objection, this a strong argument in its favour; as any other shape of wick, which produces less light in proportion to the sperm burnt, must obviously be defective from some cause or other.

Mr. Grafton gives an elaborate theory of some of the causes which produce varying results in the different shapes of wick he employed. This may or may not be correct; but he barely touches on the main cause, which is the obstruction of the light of the flame by the wick itself. That this is so can readily be demonstrated by means of an upright flame like that marked "D" in the diagrams. If a series of tests be taken against a definite volume of light, first with as long a wick as possible, then with shorter, and finally with as short as possible (say with about ¼ inch of charred wick), it will be found that the results diminish regularly, until with the shortest they come out precisely similar to those obtained with a "B" shape wick.

A most serious objection to shape "A" as a standard, is that it is invariably coated with soot, which increases the longer the candle is alight (away from draughts). This deposit of carbon is proof positive that some of the sperm is wasted; and the wick becoming thicker as the deposit increases, more light is lost by obstruction. These objections do not apply to "B;" and it has the further advantage that the results it gives are unaffected (within wide limits) by the number of threads in the wick, the consumption of sperm, or twisted wicks.

I do not think Mr. Grafton is justified in naming "A" the "natural" bend. Indeed, he shows in diagram E that he is not. The fact is that, under the conditions in which gas testing has been carried on during the last 25 years, the candle wick *naturally* assumes a great variety of shapes; but when candles are halved before use, the shape assumed, in the majority of cases, more nearly resembles "B."

I think there must be some mistake in the diagram representing A and B with the flame. They are so nearly alike that I cannot believe a difference of a candle would be found in their results. In fact, I do not think the difference would be appreciable, unless "A" was thickly coated with soot and "B" was clean. I may also point out that the shape of "B" with flame (that marked "A" in the diagram) is very different from "B" without flame. Which did Mr. Grafton employ? I presume "B" without the flame—anyway, that is the one I refer to in my remarks.

There are many other points in Mr. Grafton's paper which appear to me to require comment; but I fear I have already taken up too much of your space.

W. C. YOUNG.

Forest Gate, Essex, May 23, 1891.

Re-Burning Spent Lime.

SIR,—In your report of the recent proceedings of the Incorporated Institution of Gas Engineers, in the JOURNAL for the 26th inst. (p. 1009), I notice that Mr. Stokes, in referring to my process for the recovery of spent lime, introduced what he made appear as a new and more novel method of performing the operation—viz., by means of rotating furnaces. I think it proper to inform Mr. Stokes that his ideas were fully anticipated years ago by my patents, which embrace several arrangements and combinations of rotating furnaces or kilns; and should he wish to re-burn lime by those means, instead of by those which he considers unnecessarily slow, I shall be glad to communicate with him. I may here remark, however, that a laboratory experiment is absolutely valueless for a process of this kind.

GEO. R. HISLOP.

Gas-Works, Paisley, May 30, 1891.

A Few Comments on Passing Questions.

SIR,—Although I am not in any way connected with gas making, I am in my fortieth year of coke making, which gives me a kind of collateral interest in the subjects discussed in the JOURNAL, which I therefore always obtain and read. Various matters have been recently mentioned in your columns upon some of which I should like to say a few words.

I was, of course, especially interested in the excellent presidential address of Mr. Trewby delivered to the Incorporated Institution of Gas Engineers; and although it is not generally allowed to discuss such utterances, the points raised or suggested may, I think, fairly be carried a little further. With his remarks upon electricity I entirely agree. Anyone accustomed to use and test machinery must see that in the high-speed engine and dynamo, with its accumulators and perishable lamps, we have not that every-day simple appliance which is found in the gas industry. That people who can afford to pay for private illumination or for advertisement will continue to use it, there is no doubt. But to put the point shortly: It is, and will remain, a *lux de luxe*.

As to the use of electricity for power purpcses, Mr. Trewby is, I think, much too favourable in his remarks. I have found electricians

in such matters very slippery customers. They use, with the greatest *sang froid*, terms which have a well-known meaning to the engineering world, with reservations of which only those who are closely watching catch the true import. What, then, is really meant by the expression, "the cost of generating an electrical unit equal to 1½-horse power is given, in two typical cases, as respectively 1·41d. and 1·08d. when the conditions as to supply were the most favourable." The cost of generating an electrical unit or horse power is one thing; but the cost of an actual or brake horse power delivered to a customer is a very different one. About four years ago, the electricians went into what they themselves described as an optimistic state, over some experiments known as "the Kriegstetin," having got, as they alleged, 87 per cent., or thereabouts, of what they were pleased to call "commercial efficiency." Now we might have supposed this referred to brake horse power actually delivered, as it is spoken of as "commercial;" but by no means. It was simply the loss in the electrical part of the work—the motor compared with the dynamo; and I have yet to learn of any electrical plant which reaches 50 per cent. in brake horse power, compared with the indicated horse power of the engine. Whereas with gas-engines there are well-authenticated cases of 20 cubic feet supplying an acutal brake horse power, which is a very different thing from "generating an electrical unit"—possibly in the dynamo only.

In regard to another subject—that of storing coal in a heap—I was rather surprised to see mentioned the proposal to store 30,000 tons of coal in a heap. The great deterioration which coal undergoes in a heap has been so fully manifested, that the practice of storing has been long abandoned here, and merits, I think, serious consideration on the part of gas managers. I am putting about 2000 tons a day into coke-ovens; but beyond enough to carry us over a holiday, I never think of keeping a stock.

The question of inclined retorts reminds me how much the same thing was tried for coke making 20 years ago, in the shape of the Appold oven. This was not inclined, but vertical. On the iron door at the bottom was spread a layer of small coke. The width of the retort or oven increased from the top to the bottom; and the gas was used in the flues around it, to carry on the coking process. It was abandoned because the coke was too solid; and the water used for cooling after the oven was drawn, remained in the coke, and produced too much moisture.

With respect to the use of oils from coke making for carburetting gas, I do not think this is ever likely to amount to a quantity worthy of much notice; our experience having been that, if you go for residuals, you must be prepared to take coke as a residual and matter of secondary importance—its value for blast-furnaces when made in any retort form of oven being largely depreciated.

A. L. Steavenson.

Durham, May 23, 1891.

Working Exhausters with Gas-Engines.

Sir,—Had I known you intended publishing particulars respecting the use of gas-engines for driving exhausters, I would have given you more details last week. These I now send.

I see your correspondent, Mr. J. Newman, states that there is no saving in labour. I can only say that in our case there is practically no labour attached to the working of the engine and exhauster. We have a Fison's regulator fixed between the engine and exhauster; and we set it to what vacuum we choose, and do not have to open or shut the valves when the charges are burnt off or put on, as in some works—the regulator being self-acting, and running the exhauster according to the gas that is being made. We do not find any trouble in driving the engine. The stokers look after it, and stop it once in twelve hours to oil up; while we clean the slides once a week, and have the piston out about every three months. We have two engines, so that when one is being cleaned, the other is running. The cost for repairs was rather heavy at first, because the jacket became clogged with a hard chalky incrustation, and we had to drill out the liner and put a new one in; but now we are using a composition which softens the water, and enables us to wash out all incrustation.

The gas used last year to drive both engines was 431,700 cubic feet, and we exhausted 20,578,300 cubic feet (not 17 millions, as stated last week); and besides driving the exhauster, we broke many hundreds of chaldrons of coke, and pumped the liquor through two scrubbers. I consider it quite a success; but as to its being as economical as steam I cannot say, not having had any experience with steam for a number of years. Our gas costs us 2s. per 1000 cubic feet to make; so you will see that the cost for exhausting, coke breaking, and pumping, is 47 cubic feet—say, 1¼d.—per 1000 cubic feet made. Perhaps with the facilities there now are for using up all breeze, &c., under the boiler, there would not be a saving in the cost of power; but with a gas-engine there is no doubt a saving in labour as compared with steam, and also in space.

W. J. Latchford.

Broadstairs, May 28, 1891.

The Metropolitan Water Supply Inquiry.

Sir,—As the Whitsuntide recess made a break in the great inquiry now being conducted by the House of Commons Committee into the question of the Water Supply of the Metropolis, perhaps you will allow me, as one who has had considerable experience in connection with water undertakings, to make a few remarks on the proceedings.

In the course of Mr. Littler's address on the London Water Commission Bill (*ante*, p. 843), he compared the charges in London and Glasgow. But such comparison is most misleading. Glasgow has neither to pump nor filter its water; and the waste there is as much as would be necessary to supply half of London. The Water Commissioners allow 49·84 gallons per head per day for a population of 800,000. Even if they distributed the water free, it would not be a fair comparison; and Mr. Littler would have done better to have taken some other town, where they have to pump the whole of their supply and filter it, to set against London, where in some localities the water is pumped twice over. Again, to make the case appear still worse, the charge for a £50 house in Glasgow is quoted at £1 9s. 2d. per annum; whereas really there are two charges—the other being £2 1s. 8d. The average of four of the London Companies is £2 4s. Mr. Littler was careful not to mention the numerous extras levied on the ratepayers in Glasgow. There is an additional charge for every little trade carried on—such as that of a baker, a pastrycook, a poor shoemaker or printer, keepers of beerhouses, coffee shops, grocers' shops, &c.—and also for gardens, &c. In London, ratepayers are using water free of extra expense for a number of purposes which are charged for in Glasgow. If all the extras were properly apportioned, even Glasgow could not be quoted as selling unfiltered water cheaply.

Taking some other places, the Manchester rate for a £50 house is £1 18s. per annum, with extras for baths, gardens, &c. This is really equal to 1s. 6d per £1 and 2s. per 1000 gallons for a meter supply. In Liverpool, the average for a £50 house is £1 17s. 6d.; and 5s. 10d. per 1000 gallons is charged for water supplied to shipping, and 1s. per hour for the attendance of the turncock. The regulations in these instances are more exacting than those in force in London. Tunbridge Wells was brought prominently forward in the recent inquiry by the Corporation Committee, to show how much cheaper a local authority can sell water than a private company; yet their charge is still £2 5s. 8d. for a £50 house, with a number of extras.

Then Mr. Littler stated that, if "it were not for the extreme equability of the *régime* of the Thames, London would no doubt be sometimes in extreme difficulty." All the evidence given by numerous experts before the Royal Commissions shows that the supply is practically inexhaustible; and the quantity of water drawn by the Water Companies cannot either be in any way detrimental to the navigation of the Thames for commercial or pleasure purposes. The driest days ever known occurred in August, 1887; and even then the Companies might have taken three times the quantity they required without injury to any of the interests involved. Therefore there can be no possible doubt that the Thames is capable of supplying London for the next half century. So much cannot, however, be said for the model towns set up by Mr. Littler; for it is well known that both Manchester and Glasgow may, with a dry summer, have to meet requirements that will put them within measurable distance of a water famine.

I will now pass to another phase of the question, which came forward in connection with the next Bill to engage the attention of the Committee—viz., the Metropolis Water Supply Bill. In his opening address, Mr. Rickards stated that the value of the cry of a "monopoly" is lost, inasmuch as, whatever authority acquires the various works, the supply must always remain a monopoly; and immediately afterwards he affirmed that the existing Companies have no monopoly, for it is "competent for any body or any Company to apply to Parliament for power to set up a competing water supply within any of the districts." It may be "competent" for Mr. Rickards to apply to Parliament to oust the present Companies; but he may take it for granted that no Parliament would give him the powers. If there had been the shadow of a chance of doing this, it would have been done years ago; and the House would have been inundated with little Bills. No American Legislature would admit this kind of confiscation.

Mr. Rickards's advocacy of a dual service was exploded many years ago; and surely there is no member of the Institution of Civil Engineers who can be found to propose such a scheme for London, which is now receiving an ample quantity of well-filtered water. After advocating this dual supply, Mr. Rickards went on to say that "he doubted if it would be physically possible to lay down mains through thousands of streets, and whether in some cases there could be found room for fresh mains." This being so, how is he to bring in dirty as well as good potable water? There must be duplicate mains, services, and fittings; the cost to the householder would be doubled; and the thing would become a source of danger to the community. Discrimination in the use of different kinds of water cannot be left to servants. The quality of the water would not be considered by them; and disease would be largely disseminated. At the present time, the cleansing of the cistern and the care of the household filter are left to the servant; and instead of the latter appliance being a safeguard, it is frequently a propagator of disease, especially in hot weather. If the system were practicable, what amount could be saved to the ratepayers after all the mains and fittings were purchased and fixed. It costs the same to pump dirty water as pure filtered water; and it cannot be rendered cheaper for fire extinguishing or street watering (the only purposes for which dirty water is available). The Chelsea Company once tried the experiment by constructing special reservoirs for these purposes; but they found there was no saving in expense, and it proved very disadvantageous, so it was quickly relinquished. There is an ample supply of pure water in London for all time, if proper measures are taken to preserve the whole of the rainfall over the watershed of the Thames; and it cannot be necessary to imitate Roubaix or Paris where the supply of potable water is very limited. As your readers are aware, in times of drought the Seine is drawn upon to such a considerable extent that the death-rate is greatly increased.

I do not quite see where any saving would be effected by the Southwark and Vauxhall Company ceasing to pump water to Putney Heath. The Company are compelled to maintain the pressure required for that height, having other districts to supply where there are no high-service reservoirs. Mr. Rickards should explain how much the ratepayers would benefit by stopping the Southwark supply one mile short of Putney Heath. The concentration of the undertakings under one authority to effect such alterations (they are not improvements) certainly cannot be economy, as capital must be raised for laying larger mains; and the new authorities are to be highly-paid officials similar to the present Engineers. The assertion that some of the present works are useless, and are to be given in over the bargain, is mere claptrap, as no Company would be found to carry on works for the supply of water unless they were useful, and could not be dispensed with. When Mr. Rickards points out the "useless" works, we shall be in a better position to show him his error.

Inspector.

May 26, 1891.

The Midland Lighting Company, Limited, has been formed, with a capital of £25,000, in £10 shares, to acquire the several undertakings now carried on by Mr. R. F. Heath, at the Sun Lamp-Works, the Belge Lamp-Works, and other works in Birmingham and elsewhere.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Bills last week:—

Bills read the first time: Electric Lighting Provisional Orders Bills (Nos. 1 to 4); Southwark and Vauxhall Water Bill.

Bills read a second time: Gas Provisional Orders Bill; Water Provisional Orders Bill; Gas and Water Provisional Orders Bill.

Bill read a second time and committed: Penmaenmawr Local Board Bill.

Bills committed to a Select Committee, consisting of Earl Lauderdale (Chairman), Viscount Powerscourt, Lord Scarsdale, Lord Lamington, and Lord Sandford; to meet on Tuesday, June 2: Fylde Water Bill; Garw and Ogmore Gas Bill; Rhyl Gas Bill; Western Valleys (Mon.) Water Bill.

HOUSE OF COMMONS.

The following progress was made with Bills last week:—

Bills read a second time and committed: Electric Lighting Provisional Orders Bills (Nos. 5 to 12).

Bill read the third time and passed: Southwark and Vauxhall Water Bill.

THE METROPOLITAN WATER SUPPLY INQUIRY.

Seventh Day—Wednesday, May 13 (*continued*).

(*Before Sir* MATTHEW WHITE RIDLEY, *Chairman; Mr.* T. H. BOLTON, *Sir* ALGERNON BORTHWICK, *Mr.* BRISTOWE, *Mr.* H. W. LAWSON, *Mr.* J. W. LOWTHER, *Mr.* MURDOCH, *and Mr.* ROWNTREE.)

SOUTHWARK AND VAUXHALL WATER BILL.

At the close of the case for the promoters of the above Bill, as given in the JOURNAL last week,

Mr. FREEMAN addressed the Committee on behalf of the London County Council. He said that there were two questions arising on the Bill—first, whether the proposed works were necessary works within the strictest meaning of the word; and, secondly, if they were necessary, how they could be paid for, doing the least possible mischief to the ultimate question of purchase, which the Committee would have to consider. They asked, in the first instance, if the Committee were satisfied that all or each of the works was of such immediate necessity that they could not stand over for a year or two more, during which period the whole question might be definitely settled; then that they should be begun and carried out with a certain amount of supervision by some responsible department, who could represent the wider interests of the community outside, who eventually must bear the cost. Therefore he suggested that such works as were immediately required should be done under the superintendence of the Local Government Board, who should say whether or not any particular work should be begun at once, and in what manner and at what cost.

Mr. BIDDER: Would you at the same time put a clause in the Bill to relieve us of all responsibility in regard to the supply of water?

Mr. FREEMAN said that matter could be dealt with when they came to clauses. As regarded the second point, assuming the money was to be obtained at once, the question arose how it could be raised so as to inflict the least possible injury upon the persons who were ultimately to pay for the works. Admitting the principle which Parliament had acted upon during the last few sessions in various Bills—that some provision must be made to guard against unduly enhancing the cost of the works when they had to be bought, as against the purchasing authority—the question would be how this could be most simply done. The principle they desired to have established was that, while in raising the money for the works which were shown to be necessary, the Company was not to be put to any loss upon the raising of the money, yet, on the other hand, it was not directly to receive an increased value to be charged against the purchasing body in respect of the earnings of that particular money. They must get the advantage of it, and a very fair advantage, in this way: That unless the Company could carry out the works now, their existing works would become of less value as earning property, because they would not be able to fulfil the requirements which they must fulfil if they were to continue as a Company supplying water in the district. Therefore, the new works would put them in a position of continuing to earn not only a profit upon the present limits of supply, but also an increasing profit, by means of the new works, upon the persons whom they would be able to supply in future.

Mr. *H. L. Cripps*, the Parliamentary Agent of the London County Council, examined by Mr. FREEMAN, gave details as to the legislation of recent years in regard to Water Bills, and the part taken therein by the County Council and their predecessors, the Metropolitan Board of Works. He said the reason the sinking fund clause, inserted in various Water Acts in 1886, had not worked satisfactorily really took them back to the original question—viz., What is the effect, in circumstances such as now exist, of authorizing a water company to create additional capital? The view entertained by the local authorities was that the mere fact that a company were applying for additional capital meant that their undertaking was not now in a thoroughly efficient condition. If, therefore, a purchase were being carried out at the present time, it would be a purchase on the basis of the concern not being thoroughly efficient; the capital not being so remunerative or productive as it should be. The object of the additional capital was to put the Company in a thoroughly efficient position; and therefore they must regard not only the fact that the expenditure of the actual cash in new works was in itself a remunerative investment, but also the fact that the expenditure on new works was in that way strengthening all the existing capital of the undertaking, was confirming any deficiencies which had previously existed, and was putting the Company in a position to state before any arbitrator that their concern was thoroughly efficient, instead of being in a condition in which it wanted additional capital. Therefore there was very great difficulty in dealing with the consideration of how the investment of money should be limited so as to make it really productive for the purposes in view, without putting on an undue burden in the event of possible purchase. The County Council were most anxious that any works that could be shown to be necessary should be carried out with the least possible delay. Of course, if there was any doubt about the filtration of their water, nobody would be more anxious that this should be remedied than the London County Council. He recommended that it should be referred to the Local Government Board to decide, immediately after the passing of the Bill, what works were necessary to be proceeded with; and he submitted a clause which he thought would carry out the views he had expressed with reference to raising capital without influencing the question of possible purchase.

Mr. BIDDER said the suggestion of the witness came to this: If Parliament would only refuse to provide the necessary capital to enable the Company to keep abreast of the demands upon them, a time would come when they would not be in an efficient position, and no longer able to present themselves to the arbitrator, when the question of purchase arose, as being in a satisfactory condition; and this would enable the County Council to argue for a reduction of the purchasing price.

Witness said he did not think it would. The suggestion of the County Council certainly would be that, whatever capital expenditure was shown to be necessary at the present time, was expenditure which, in the interests of London, ought to be made. With reference to the suggestion as to the appointment of a Local Government Board official to decide on what works were immediately necessary, it was quite possible, supposing the water companies' undertakings were consolidated, that the proposed filter-beds would not be required, as the aggregate filtration area of the Companies might be sufficient. His amendment to the sinking fund clause differed from that contained in the Bill, because the latter only provided for the interest upon the amount of stock; so that if, by the issue of £150,000 worth of stock, they raised £300,000 in cash, the clause applied merely to the stock, and not to the whole capital invested.

Mr. *A. R. Binnie*, M. Inst. C.E., Engineer to the County Council, was also examined by Mr. FREEMAN. He supported the proposal to refer to some independent authority the question of the necessity for works. He said that up to the present time no opportunity had been given to him to find out the requirements of the Company; no formal answer having been given to an application that he should be allowed to visit the Company's works.

In cross-examination by Mr. BIDDER, witness said he thought the restriction was necessary because it was not expedient, in the public interest, that the Company should go on, as they had been doing in the past, piling up capital, which at no distant date would have to be bought up by the public, without the expenditure being hedged round by proper restrictions. He did not suggest that the Company had behaved badly in the past, or that there was anything in its circumstances that would be a temptation to behave badly in the future.

Mr. FREEMAN intimated that this was all the evidence he proposed to offer for the County Council.

The CHAIRMAN said the Committee would certainly be inclined to pass the preamble of the Bill; but, of course, there were certain questions as to what restrictions should be put upon the Company; and it would be convenient if Mr. Bidder would address them on these points. Upon general principles, they would grant the Bill.

Mr. BIDDER then addressed the Committee, urging that the Company might safely be entrusted to spend the money to the best advantage in their own self-interest; and, as General Scott had told them that the works were necessary, he asked what more could be wanted. As to the suggestion for the inspection of accounts, to see that the capital was *bonâ fide* expended, the accounts were subject to the audit of Mr. Stoneham, under the Act of 1871; and this gentleman had been very strict in drawing a distinction between capital and revenue. With regard to the sinking fund clause, he submitted that there was no reason to depart from the decision of the Committee of 1886. The principle then adopted was one which was very carefully fought out and applied in the case of the three Bills before that Committee—those of the East London, Lambeth, and Southwark and Vauxhall Companies; and there was an interest in having uniformity of legislation.

The Committee deliberated in private for some time. On the re-admission of the parties,

The CHAIRMAN said: The Committee have been carefully considering the several points in this case. They will require some allocation of the capital to specified works; and therefore they would like the promoters to bring up a schedule. They do not wish to hamper the Company unnecessarily; but they want some indication of the allocation of the capital. With reference to the sinking fund clause, the Committee have been discussing it very carefully; and they are not quite able to come to a decision upon the point to-day. I do not know whether or not we could be supplied with any evidence which would clear up the matter. As to the remark in the Local Government Board report, "It will thus be seen that the earnings which the Company receive go to swell the dividends of the shareholders without contributing to the sinking fund," and so on, the Committee, before they proceed to alter the sinking fund clause, would like to see their way clearly as to that point. They want to be satisfied that, in authorizing the raising of the money which it is proposed to raise in this Bill, they will not be really adding to the price which the public would have to pay for the ordinary capital of the Company. The Committee give no decision about it at present; but they will require to be satisfied upon the point.

Eighth Day—Thursday, May 14.

On the re-assembling of the Committee to-day,

The CHAIRMAN intimated that they would take first the question of the allocation of the capital.

Mr. BIDDER said he gathered from what was stated the previous afternoon that the Committee desired that it should appear upon the face of the Bill what were the purposes for which the Company were asking for the bulk of the capital, without unduly hampering them;

and what he proposed to do, in order to carry out the view of the Committee, was to insert a clause on this principle. The promoters had given the Committee the estimates in each case of the specific works that had been indicated; but, of course, they could not positively pledge themselves that they would be the exact amounts that the works would cost, though they believed them to be approximate figures. They might, in some cases be slightly exceeded; in others the Company might be able to do the work for something less. Therefore the promoters proposed to take in each case a figure slightly below the estimate they had made. For example, in the case of the extension of the mains and services, which they had put down at £50,000, they now proposed to take a figure corresponding to that of £40,000, and to say that £40,000 of the moneys authorized by the Act should be applicable only for this purpose. Then they would deal in the same way with each of the other items; and this would leave a certain balance available for any of the special or general purposes of the Company to which capital might be properly applied. This would give a certain elasticity, and would do what the Committee desired—viz., allocate the money practically without unduly hampering the Company The clause which he proposed for carrying this into effect was as follows:—

Of the moneys raised under the powers of this Act, £30,000 shall be applicable only to the purpose of providing additional filtration; £85,000 shall be applicable only to the purpose of providing additional reservoirs at Nunhead; £40,000 shall be applicable only to the purpose of providing additional engine power; £30,000 shall be applicable only to the completion of the high-pressure service; £40,000 shall be applicable only to the purpose of the extension of the mains and services; and the balance may be applied to any of the above purposes, or to the general purposes of the undertaking to which capital is properly applicable.

That balance would be £55,000. Of course, if the Committee thought that £55,000 was an unreasonable sum to have elastic, although he confessed he did not, the figures might be modified so as to cut it down to £50,000 or to £40,000. But in a question of this kind, there must be some amount of elasticity; and he thought that the amount he had named was not unreasonable.

Mr. FREEMAN pointed out what he considered to be a very serious question. Supposing the Company's undertaking were bought up very shortly by the authorities, they would then be able to come forward and say, "We have power to raise the money for each one of these specific purposes," although it might turn out that some one of the purposes might not have been necessary; and then they would have all this capital behind their backs with absolute power to use it.

Mr. BIDDER said that would not affect the result.

The CHAIRMAN: If the controlling authority is changed, and the Company's undertaking is bought up, they will be the persons to decide whether or not this money is to be spent.

Mr. FREEMAN argued that they would be entitled to ask for capitalized profits upon the earning capacity of the money.

Mr. BRISTOWE said this would not be allowed by the arbitrator.

Mr. FREEMAN submitted that the clause required an addition; and he proposed it, as follows: "In the event of a purchase by any public body of the Company's undertaking, no benefit, advantage, compensation, consideration, or increased value derived from the outlay of capital sanctioned by this Act should be taken into consideration in assessing the compensation and purchase-money to be paid or awarded for the Company's undertaking."

Mr. BIDDER said that, whether the clause was right or wrong in principle, this was a question which ought to come up on the General Bill because all the Companies should be "tarred with the same brush."

Mr. FREEMAN expressed the opinion that, as the question was so inextricably mixed up with the sinking fund clause, it would be better to defer for the present the decision on the point.

The CHAIRMAN assenting,

Mr. BIDDER said, with reference to the sinking fund, that he was willing the interest on the premiums should go to that fund; and he would agree to an amendment of the clause to provide for this.

After some discussion,

Mr. BOLTON said the clause would read in this way: "From and after the expiration of three years from the issue of any debenture stock under the powers of this Act, there shall be carried to a sinking fund in each year such percentage on such amount of debenture stock, and any premium received thereon, as shall be equal to the excess of the average percentage."

Mr. FREEMAN thought that, assuming the principle of the clause, these words carried it out very well; but upon that he would move, as an addition the clause he had read, to the effect that it should not be taken into account on the purchase of the undertaking.

After some further discussion on the point,

Mr. FREEMAN said he had an alternative, which was extremely simple, and would meet the requirements of the case. Instead of any of the complications of premiums and sinking fund, the alternative he suggested was that the funds which were stated to be necessary for carrying out the works under the Bill should be raised in the cheapest possible manner—viz., by the public authority who could raise them cheapest—and should be lent to the Company for this particular purpose for a limited period, during which the purchase must be completed. The proposal was embodied in the following clause:—

Before any debenture stock is created under the powers of this Act, the Company shall give notice to the London County Council of the amount of capital which they require to raise, and the purpose for which it is required; and the London County Council may, if they think fit, out of any moneys which they may be authorized by Parliament to apply for that purpose, advance and lend from time to time to the Company on mortgage, repayable within a term of five years, such money as may be so required, bearing interest, up to the end of a period of two years from the passing of this Act, of 3½ per cent. per annum, and thereafter, during the residue of the term of the loan, bearing such rate of interest as is equal to the rate of interest or bonus declared and paid from time to time on the ordinary share capital of the Company during such term. For the purpose of securing the repayment of the said loan, the Company shall create, and the County Council shall have, for all moneys and interest advanced by the London County Council under this section, a mortgage or security on the undertaking of the Company, subject to any mortgages or charges subsisting thereon at the date of the London County Council making any loan or advance under this section: Provided that the money lent by the London County Council and borrowed by the Company under this section shall not exceed the amount authorized to be raised under this Act; and so far and to the extent that any money shall be lent by the London County Council under this section, such amount shall be taken *pro tanto* in reduction of the amount of additional capital which the Company is authorized to raise under this Act.

In reference to this clause, he proposed to call Mr. Harrison, the Chairman of the Parliamentary Committee of the County Council, to explain the reason for the clause being desired, and to answer any questions the Committee might put.

The CHAIRMAN said he did not think the Committee were prepared to entertain the proposal at all—they preferred to adhere to the precedent of the sinking fund; and therefore he did not consider they need trouble Mr. Harrison. It was a very strong departure. The Committee thought the public interests were guarded by the clauses; and on this point they were quite unanimous.

Mr. FREEMAN still pressed for the insertion of the addition that, in the event of a purchase by a public body, there should be no enhancement of the price.

The CHAIRMAN said if Mr. Freeman could produce any arguments or evidence that would satisfy the Committee, of course he was at liberty to do so. In the meanwhile, the Committee were quite unanimou against his proposal in this case. They considered, and hoped, t the public interests were sufficiently protected, and that the Compa also were fairly guarded, by the provisions of clause 19. This was the intention of the Committee.

Mr. FREEMAN remarked that, after such an intimation, he certainly would not, on the part of a public body, occupy the time of the Committee further.

The CHAIRMAN said it might be a matter for consideration, when they came to deal with the whole question, whether there should not be some clause put in as to the expenditure of capital by the Water Companies, as to which he did not venture to express an opinion at present.

Mr. BAGGALLAY: That would be a question affecting all the Companies alike.

The CHAIRMAN said that it would affect them all equally. It was the intention of the Committee as to the debenture stock, as it had been of Parliament before, to take care that there should not be any undue enhancement of the value of the undertaking by the expenditure of fresh capital.

The non-contentious clauses were then settled; and the Bill was ordered to be reported to the House.

The Committee then adjourned to Thursday last, when they proceeded further with the Metropolis Water Supply Bill.

New Water-Works for St. Helens.—A new system of water supply for the borough of St. Helens, which has been completed under the direction of Mr. Gaskin, the Borough Water Engineer, commenced working last Thursday week. Provision has been made, at a cost of £63,655, for a supply of 4½ million gallons per day.

The Gas-Workers' Dispute at Stockton.—At the meeting of the Stockton Trades' Council last Tuesday, speaking of the demonstration which it was suggested should be held on the 20th inst., in connection with the gas workers' dispute, the Chairman (Mr. J. Green), said that since the last meeting, he had weighed the matter over, and he thought it would not be a success. He would recommend that they wait until the elections came on in November, and then "button hole" the candidates, and in time they might be able to do some good. But a demonstration he did not think would be a success—it would only be spending a lot of money to no purpose. Mr. Proud said he quite sympathized with the remarks of the Chairman. He thought if the gas workers' grievance was sifted to the core, they would find that some of the men were not acting quite in the right; and unless they had a good, sound cause to go upon, and right at their back, the demonstration would end in no good result. Mr. Storey spoke strongly in favour of carrying out the demonstration. They had, he said, taken up the grievance of the Gas Workers' Society, which was a weak Society, and unable to fight its own battles; and he thought it was only their duty to fight the question out to the end, and lay before the public the whole facts of the case, and the way in which they had been treated by the Gas Committee. If it was a failure, then it would be the fault of the working men of the town. It was ultimately decided to carry out the original motion to hold the demonstration.

The Ventilation of Petroleum Vessels.—In the JOURNAL last week we referred to the recent fatal explosion of a petroleum vessel while undergoing repair in the Newport Docks, and to the assistance rendered on the occasion by Mr. T. Canning, Engineer of the Newport Gas Company. A few days afterwards, Mr. Canning conducted, at his works, some interesting experiments on explosive substances, in the presence of the owners of the dock where the *Tankerville* was lying and a number of their workmen. He took a portion of crude oil which had come from the vessel, and showed that its vapour, when agitated, would ignite at from 95° to 100° Fahr. On the day of the explosion the temperature in the sun was 88°; and therefore it must have been considerably more than 100° in the hold of the ship. The vapour from the oil in the ship was therefore liable to ignite immediately it came in contact with a flame. Mr. Canning showed how, by means of an indiarubber gas-tight bag, furnished with a suitable valve, samples of gases collected at the bottoms of petroleum tanks could be tested at frequent intervals. He subsequently, in a letter to a local paper, gave his views as to how petroleum-tanks on board ship should be ventilated during repairs. He said: "My view is that petroleum vapour and gas from petroleum should be pumped out of the tanks. This can be easily done by an ordinary gas-exhauster, with a suitable arrangement of pipes. Its accomplishment may be brought about by a fan; but an exhauster is safer, because by its means (being an inclosed fan) the gases can be sent to a considerable height above the deck, whereas an ordinary open fan must necessarily shed them on the deck level." His reason for recommending pumping was because the majority of the gases are of a higher specific gravity than common air.

LEGAL INTELLIGENCE.

COUNTY OF LONDON ASSESSMENT SESSIONS.

Sessions House, Clerkenwell, E.C.—Monday, May 25.

(*Before Sir* P. H. EDLIN, Q.C., *Chairman, and a Bench of Magistrates.*)

The Assessment of The Gaslight and Coke Company's Works.

To-day the Court resumed the hearing (commenced in March*) of the assessment appeals of Metropolitan Gas Companies; taking those of The Gaslight and Coke Company against their assessments in the City of London Union, Marylebone, St. Pancras, Bloomsbury, Shoreditch, Hampstead, Paddington, Hackney, Islington, St. Saviour's, Chelsea, Strand, Bethnal Green, Westmnster, St. George's, and Kensington. Altogether, there were 131 appeals.

Mr. LITTLER, Q.C., Mr. CASTLE, Q.C., and Mr. DANCKWERTS, appeared for the Company; while a large array of Counsel, led by the SOLICITOR-GENERAL (Sir Edward Clarke, Q.C., M.P.) and Mr. POLAND, Q.C., appeared for the respective parishes. The professional advisers of the Company were Mr. CORBET WOODALL, M. Inst. C.E., and Mr. H. E. JONES, M. Inst. C. E. For the most important of the parishes Mr. W. A. VALON, Assoc. M. Inst. C.E., Gas and Water Engineer of the Ramsgate Corporation, was retained to give expert evidence; in addition to whom, Mr. W. R. CHESTER, Gas Engineer of the Nottingham Corporation, was engaged by the Islington Vestry.

Mr. LITTLER, in opening the case, said he thought it right to say at once, with regard to all the cases appealed against, that the appellants' figures would be higher, as presented to the Court in evidence, than those which were given in the cases. With regard to all these, the first thing to ascertain was the total assessment; and then, this having been once ascertained, there would not be any very great difficulty in apportioning it amongst the various parishes—those, he meant, where there were no works. As a matter of fact, he thought there was no parish in which there was an appeal where there were works; but the question was as to mains going through the streets. So that it seemed evident, that if they once ascertained the total value of the mains, the rest would become a matter of arithmetic, to be decided by the receipts in each parish.

The CHAIRMAN said he had been looking at the list of appeals, and, as he thought Mr. Littler would desire to suggest to the Court, they were distinguishable in this respect—that the majority of them (he might say all of them save three) would have relation only to the mains and the pipes; the other three being exclusively concerned with the buildings, plant, retorts, and machinery.

Mr. LITTLER: That is so.

The CHAIRMAN said it seemed that Mr. Littler's proposition would be correct if he added that, excepting those three distinct appeals, in arriving at the conclusion with regard to any one of the others, they would be enabled to decide all; and inasmuch as there were 128 of the others, he might have the pleasure of listening to twice 128 Counsel, because each union or parish was entitled to be represented, and might, for ought he knew, be distinctly represented by Counsel. If this were so, he could not express any opinion with regard to those 128 appeals relating to mains and pipes without hearing what the Counsel in each case had to say. He appealed to the Solicitor-General to say if he had not stated the position correctly.

The SOLICITOR-GENERAL said his Worship had, exactly, except that his terrors were not quite well founded, as there were not separate Counsel in each case. A list should be handed up.

The CHAIRMAN asked if the same Counsel appeared in all the City of London cases.

The SOLICITOR-GENERAL said he should lead in all those cases. As a matter of fact, there were only four leading Counsel. He also appeared for Shoreditch, Hackney, Islington, Bethnal Green, and Kensington; Mr. Poland would lead in eight other cases; Mr. Fullerton in others; and Mr. Marshall in others. With regard to the three cases which raised the question as to the rating of retorts and so on, Mr. Poland appeared in those cases for the respondents.

The CHAIRMAN asked if Mr. Littler intended to go into the entire value of the property, including the plant and buildings.

Mr. LITTLER said what he proposed doing—and it seemed to him to be the only practical course—was this: He proposed to show the total value in all the parishes that were identical; and then it seemed to him that the division of whatever amount the Court might finally fix would be a matter of arithmetic, which they could arrange among themselves.

The CHAIRMAN: According to the receipts of the Company in each parish?

Mr. LITTLER: Exactly. That was what he proposed; and it seemed to him reasonable, now that they knew who their antagonists were, to deal with the whole. He should not object, therefore, to Mr. Poland or the Solicitor-General cross-examining on anything they desired with reference to any of the parishes; and the same would apply to Mr. Fullerton and Mr. Marshall. He thought this was a reasonable way of dealing with the case.

The CHAIRMAN said it should, at all events, be understood that he would, if necessary, hear each of the leading Counsel.

The SOLICITOR-GENERAL said he was very anxious to concur in any arrangement that might be convenient to the Court; but he did not think the course proposed would be either to the advantage or the convenience of the Court, because, although the question undoubtedly was the same in its inception—that was to say, the first question must be the rateable value of the whole hereditament—the Counsel were instructed by different Solicitors who had their valuations upon which their assessments of the Company's property had been based; and he thought it would become an extremely lengthy and complicated inquiry if they were to try, with different sets of surveyors, different cases at the same time.

The CHAIRMAN suggested that it would be better, in view of the possibility of such confusion and complication, to reserve the matter until it actually arose.

* See *ante*, pp. 503, 557, 559.

The SOLICITOR-GENERAL said it might be advisable to wait until Mr. Littler had opened his case, and they saw in what respects they were in conflict; but he thought it would be much more convenient if the Court were to deal with the case of the City of London Union, which covered a large number of others, and, confining themselves to them, allow him to deal with them in cross-examination and by evidence.

Mr. LITTLER said he was content, so long as judgment was reserved on the others.

The CHAIRMAN said he had already told them that he did not think the Court could, with propriety, express a judgment without hearing those who took different views from those entertained by the Solicitor-General's clients in these particular cases; but with regard to the proper basis for valuation, that seemed to him to be the substantial question upon which the Court would now hear Mr. Littler.

Mr. LITTLER said he desired to mention, at the outset, that the main, though not the entire reason of the figures submitted to the Court being considerably higher than those presented in the cases, was because of his Worship's decision in the South Metropolitan case; the view there taken being that the year 1890 might be accepted as somewhat conclusive. His Worship, whose reasoning he quite followed and accepted, was of opinion that the 1890 figures could only be regarded as corroborative or confirmatory of any view which a hypothetical tenant who knew his business would be likely to entertain in 1889. The learned Counsel then read the following extracts from the report of the case which appeared in the JOURNAL:—

> The Chairman suggested that they might take any facts which would throw light upon the present valuation, without regard to time. The Assessment Committee must obviously base their decision upon the accounts of the Company which they were able to inspect. He did not know the date of the decision of the Committee; but if, upon the subsequent accounts, figures were arrived at which showed an altered state of circumstances that might result from the increased price of materials and so on, which must affect profits, if those circumstances into which the Committee had no power of investigating were presented to the Court, and if the Court based its decision on those figures, they would not be saying whether the Committee were right or wrong, but would be dealing with the matter on an entirely different basis. . . . He had shown a way out of the difficulty. They might say that the possible results of experience should have been present to the minds of the Committee. If they asked the Court to depart from the position of saying whether the decision of the Committee was right or wrong, and become, as it were, fresh valuers, and take into account what was perhaps never before the Committee, he must admit that he saw considerable difficulty in that. It seemed to him that the Court had an issue before them, and could not depart from it. He appreciated the trouble in which the parties were, and he saw the possible injustice of it; but this did not alter the legal position. When the question arose on the evidence, the discussion that had taken place would not have been thrown away, because they could use the arguments, and take a formal note of what was admitted or rejected. At the present moment the Court thought that, on this important question, it would be quite open to the appellants to say that all the facts alluded to ought to have been in the minds of any really well-informed Assessment Committee.

He did not propose to depart one point from the view that the Court then expressed. His only reason for mentioning the South Metropolitan case was to justify his clients for their figures not being the same as those presented to the Assessment Committee. He would tell the Court what the difference was, so that his learned friends could appreciate it at once.

The CHAIRMAN said he had looked at about half-a-dozen of the appellants' cases, and he found they were all the same.

Mr. LITTLER said of course they were, because the facts were the same. He had before him a summary of what was the old assessment, what was the assessment passing the Assessment Committee, the figures on the cases for the City of London Union, and the figures which they proposed to present to the Court; and when he had submitted these, he would give his Worship a short account of the history and position of the Company. This list gave both the City of London and the Metropolitan parishes. In the City, the assessment for the last quinquennial period was £27,164 rateable value. The assessment as fixed by the Committee was £51,817. He would pause there just to remind his Worship of what appeared on the face of the cases—viz., that, the parishes having somewhat smitten the Company with whips, the Assessment Committee applied a scorpion. The assessment having been considerably increased by the Overseers, the Company appealed; and the result was that the Committee considerably increased the figures, which aggregated to a total of £51,817 for the new quinquennial period, as compared with £27,164 for the last. In their calculations, the Company dealt exclusively with the figures for 1889 in the first instance; and they came to the conclusion that the total figure should be under that which they had been paying for the last quinquennial period—viz., £15,582; but, applying very carefully the results of his Worship's views as expressed in the South Metropolitan case, they had come to the conclusion that the right figure was £24,882. The two figures now in contrast, therefore, were the £51,817 as contended for by the Solicitor-General, and the £24,882 as contended for on the part of the appellants.

The CHAIRMAN asked if the Company had given notice to the respondents that they proposed to increase the value by £10,000.

Mr. LITTLER replied that he was afraid they had not, because the full effect of his Worship's ruling had not been appreciated in the first instance; and whatever might be the consequences, if there were any, of not giving such notice, the Company would have to suffer them. If the Solicitor-General were to say he was content with those figures, possibly something might result. This appeal differed from some others only by the magnitude of the business affected by it, and the large figures with which they had to deal; the Company being the most extensive gas undertaking in the universe. They possessed 1870 miles of mains, and delivered during the year 18,336 million cubic feet of gas. They had a gross revenue of upwards of £3,000,000; and it was increasing. The net revenue, however, was not increasing; and this was a matter about which his Worship would hear something in the course of the case. One subject that required consideration at starting was this: This was a concern in which the hypothetical tenant would be responsible

for the lighting, and therefore practically for the safety of an enormous assemblage of streets, courts, and passages in the Company's district; and therefore he would have to take into careful consideration the conditions under which he had to accept the tenancy. In point of fact, the area covered was nearly the whole of the north of the Thames within the London County Council's jurisdiction. Of course, he need not remind the Court that the Company or the hypothetical tenant who took over this concern for a year, or a series of years, on an annual calculation, would have to comply with all the statutory requirements over this enormous area; and these, under the Metropolis Gas Act, were of a very special nature.

The CHAIRMAN asked if the London County Council were objecting to the under-rating of the Company in any of the parishes in question. He said he had not gone through the schedules of the County Council cases to ascertain this.

The SOLICITOR-GENERAL said he believed there would not be any such objection.

The CHAIRMAN said if there were, the Court might have to reserve judgment in this case; being under the necessity of hearing arguments upon the ground that the Company had been under-rated. In St. George's Union, for example, there were 3000 separate objections; and he thought possibly the Company might be one of them.

Mr. LITTLER said that the fact that no such objection had been taken by the County Council showed that they were clearly of opinion that the Company were not under-rated. This was all he had to say on the matter. The year in question in the present appeal was one which was of very considerable importance—certainly to the gas world, and also with regard to all considerations affecting labour, both skilled and unskilled. It was during the year 1889 that the labour troubles developed themselves very extensively, and quite as much with regard to gas manufacture as to anything else, because during that year there was the extensive strike at the South Metropolitan Company's works. In December, 1889, these labour troubles would be perfectly well known to any person intending to take over the works; and not only was this true of the direct difficulties with the gas stokers, and so on, but troubles had extended to another field which affected the Company very much—viz., to the colliers. When he told the Court that the Company consumed 1,800,000 tons of coal in a year, they might judge how very much its price affected the interests of anyone who intended to take this concern as a hypothetical tenant. He would say further that up to June, 1890, the figures and the results of these various operations ought to have been, and he believed that they were, present to the minds of the Assessment Committee themselves.

The CHAIRMAN said he was glad Mr. Littler had come to this point, because it should be the first matter for consideration. It seemed to him that this was really the preliminary question they had to decide. If they were to put a proper valuation upon the property, and if they were to arrive at a conclusion upon the basis of certain accounts of the Company, surely the first question was as to the time up to which they should require to have these accounts, in justice to both parties. He understood the accounts were made up half yearly; and he took it that it would be to the 30th of June and the 31st of December. But a month or six weeks, or even two months, would expire before they would be made up. Then arose the question whether the Overseers, to begin with (or, if not the Overseers, the Assessment Committee), had those accounts before them; and if they had not, whether the Court, sitting as a Court of Appeal, would not say: "We will look at the accounts as they may have been made up to those dates."

Mr. LITTLER said that the accounts were made up within three weeks after the end of each half year; and he was instructed that, as a matter of fact, they were before the Assessment Committee.

The CHAIRMAN said if this were the case, would they not be acting fairly if they took, not the recorded calendar year of 1889, but the twelve months beginning on July 1, 1889, and terminating on June 30, 1890; dealing with those accounts, extending over twelve months, as the basis of the valuation they had to make?

Mr. LITTLER remarked that he should be quite content that that course should be adopted.

The CHAIRMAN said this was the preliminary question for consideration. He could quite understand, if there were an additional three months—if it were taken to the 30th of September or the 30th of March—the accounts might present a different aspect in the interests of one side or the other; but, in fairness, if, according to the cases, they had to ask for an annual account, might they not begin with the 1st of July, and let the twelve months terminate on the 30th of June, 1890, and look at these accounts for the purpose of ascertaining what the valuation should be?

Mr. LITTLER said, so far as he was concerned on behalf of the Company, he thought what his Worship had suggested was practical; and he should be quite agreeable to carry out the suggestion.

The CHAIRMAN suggested whether, if they went beyond this, they would not be placed in the domain of speculation and conjecture. One witness would say that, in his opinion, the price of coal would go down; and another would say that it would be raised, and that no tenant would give as much for the net profits. But were not the cases to the effect that they were to take the receipts of the Company, gross and net, and value the undertaking accordingly? If this was the effect and substance of the decisions of the Superior Courts, by which this Court was bound, might they not determine what should be the accounts, when beginning and when terminating, that should form the basis of this valuation?

The SOLICITOR-GENERAL said he had not seen the accounts which he understood it was now suggested should be used—those up to June, 1890. He believed that in the case of the City of London Union they were in the hands of the representatives of the Company when they were before the Assessment Committee, though he did not believe this would apply to some of the other parishes. He would be very glad, as early as possible, to get at the accounts before his Worship.

The CHAIRMAN expressed the hope that the Solicitor-General did not think he was in any way prejudging the case. He was only putting it before the parties that it was manifest, if they followed the decisions, that they must take the accounts of the Company as the basis of the valuation; and if they had to look to these, when should the investigation begin and when should it end? He did not know how the accounts would bring it out.

The SOLICITOR-GENERAL said neither did he; but he was informed that all the accounts were in the possession of the Company, and were used by them when appearing before the Assessment Committee. At the same time, those accounts had not been supplied to the respondents in any way, so that they could examine and tabulate them.

Mr. LITTLER produced a paper which he said was handed to them at the time, and which did tabulate the figures. This was only for the City of London Union; but he was told that all of them had it. It contained the following particulars: Total gas-rental earned in 1884, £2,346,362; in 1889, £2,332,780—decrease in 1889, £13,582. His Worship was quite right in saying that in 1890 there was an increase, because they raised the price of gas by 3d. per 1000 cubic feet in consequence of the various labour troubles, with which he would have to deal. The expenses were: Salaries (manufacture) in 1884, £19,448; in 1889, £19,846—an increase of £398, or 2 per cent.; wages, £214,846—an increase of £74,334, or 35 per cent.; purification, an increase of £7829, or 15 per cent.; salaries (management), an increase of £1566, or 12 per cent. In addition to the above, the coal contracts were renewed at a considerable advance; the price being 13s. 9d. per ton in 1884, and 15s. 4d. per ton in 1890—involving an increased expenditure of £150,000.

The CHAIRMAN: Beginning from what time? The Company had had the advantage of that for three months. If the accounts terminated on the 30th of June, they would be entitled to present that increased price of coal for three months.

Mr. LITTLER said he understood that, though the contracts were made in March, delivery was not commenced till later on. He wanted to point out how much was known both to the Company and to the Assessment Committee. The system of working eight hours instead of twelve would, of course, raise the cost of manufacture by one-third; and the advance in the price of gas on the north side of the Thames would only partly meet that increased cost. When the Company raised the price of gas, they decreased their dividend; and they had had to take upwards of £100,000 from the reserve fund wherewith to pay it. He believed the amount withdrawn from the reserve fund in order to meet the diminished dividend was £145,000. The dividend was 13, or 13¾ per cent.; but it was less in 1890. His Worship would remember that the sliding scale had been introduced for the express purpose of encouraging gas companies to make gas as cheaply as possible, in order to give them a higher dividend the lower the charge made for their gas.

The CHAIRMAN said it was a very remarkable fact that, while the Company's gross receipts had increased by more than one-seventh, the net receipts were alleged to have been diminished by one-sixth. It was a most startling fact, according to their figures; but then those figures were based on the entire year 1890. It was very singular that there should be an enormous increase in the gross receipts, and yet a diminution in the net receipts by very nearly one-sixth. He thought possibly they would have heard that the dividend had been lowered in a corresponding ratio.

Mr. LITTLER reminded his Worship that, whatever might be the receipts, the Company's expenditure upon the one item of coal, for instance, amounted to £150,000 more; and also that they would have reduced their dividend still further had they not drawn upon the reserve. He was told that during the last two years the amount taken from the reserve fund had been £422,000.

The CHAIRMAN asked, if the Company entered into a contract in March for the future delivery of coal at enhanced prices, whether the Assessment Committee would not take into consideration this contract in determining the amount which the tenant would give, although it would not come into immediate operation.

Mr. LITTLER replied that they ought to do so, but they did not. He said that not only must the Committee take the Company's accounts, but they should hear their witnesses (as he hoped the Court would hear them), and also hear what intelligent and experienced persons in the gas world would say as to what was likely to be the future of gas undertakings.

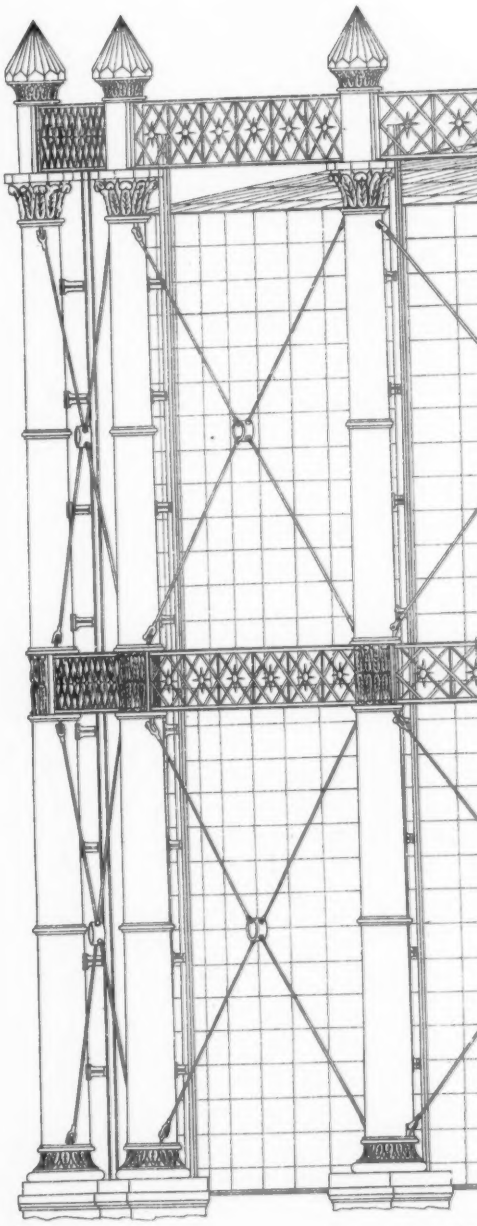
The CHAIRMAN said this would then place them ultimately in the land of conjecture and speculation. Some might say that they looked forward to a large decrease, and some to a large increase; and they should hear witnesses on both sides. He did not see, however, how it could be excluded.

The SOLICITOR-GENERAL said, with reference to the figures on the paper which Mr. Littler had just read, and which he had rightly suggested was brought to the notice of the Assessment Committee, it was not an account, and did not purport to be one in any sense. It only gave an account for the year 1889, because it alleged decreases and increases in revenue and expenditure respectively during that period. So far as that year was concerned, the only information given to the Committee was that which was contained in the paper—viz., the fact that the coal contracts had been renewed, without saying when the expenditure would begin in respect to these contracts, and a statement that the eight-hour shifts would further increase wages by one-third, and that the increase in the price of gas would only partially meet the contingency.

The CHAIRMAN said this was clearly insufficient. If they were to accept the accounts for that twelve months as the proper basis, it was clear that it would have to be fresh stated, and each party have an opportunity of considering it; otherwise they would be arguing the matter in the dark. He asked the Solicitor-General what he said to accepting the twelve months from July to June as the basis.

Mr. LITTLER said he was told that the Solicitor-General's clients had accounts for the twelve months up to June.

The SOLICITOR-GENERAL, in reply to his Worship's question, said the accounts they had to deal with in making this assessment and in discussing it were those for 1889, and with those he was prepared to deal; and they had been investigated by experts on either side. He, of course, agreed that in considering those accounts, and applying them for the purpose of deciding upon the rateable value, neither the Assessment Committee nor the Court would be bound by the actual figures, if it could be shown that there were elements of disturbance involved which would reduce the rent the hypothetical tenant



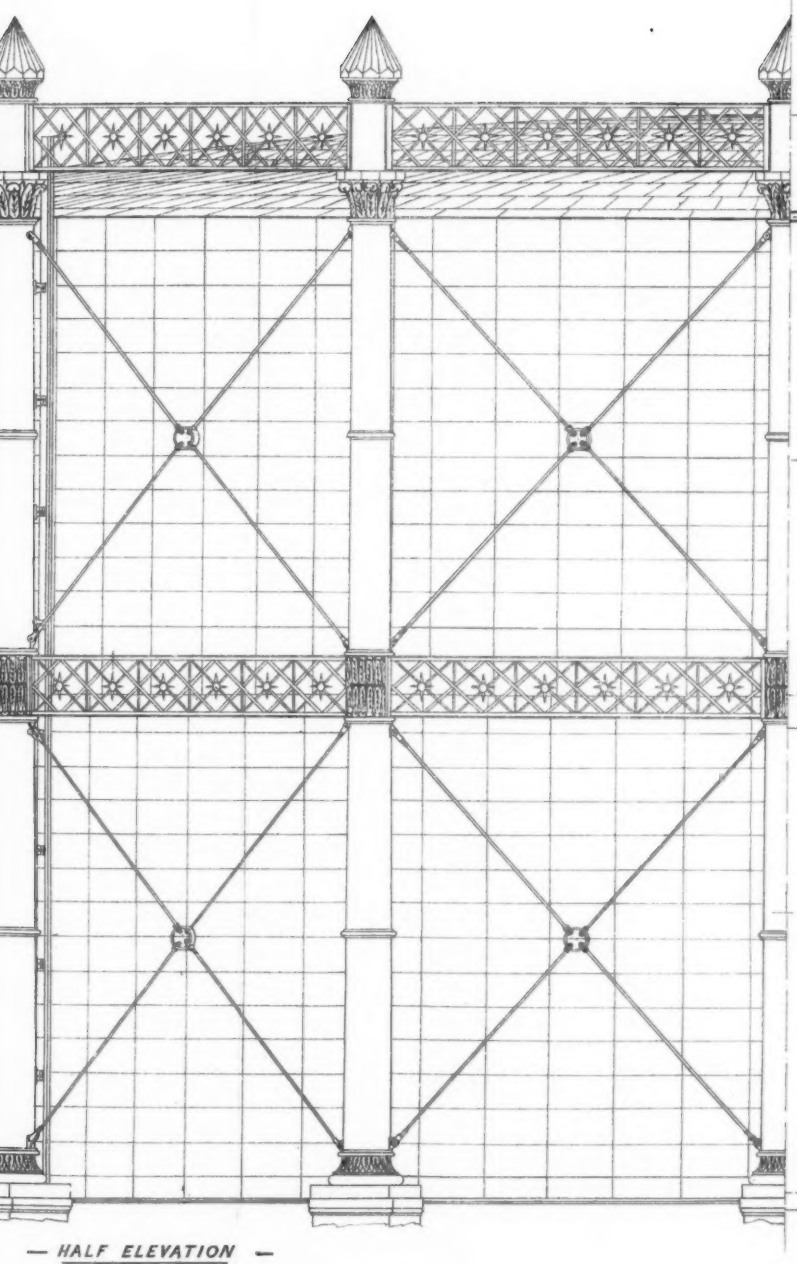
— HAL

KING BELL & RAILTON, PHOTO LITHOS, 12 COUGH SQUARE, E.C. & BOLT COURT, LONDON, E.C.

BUENOS AYRES CO-OPERATIVE

TELESCOPIC GASHOLDER 120 FEET

Scale in Feet

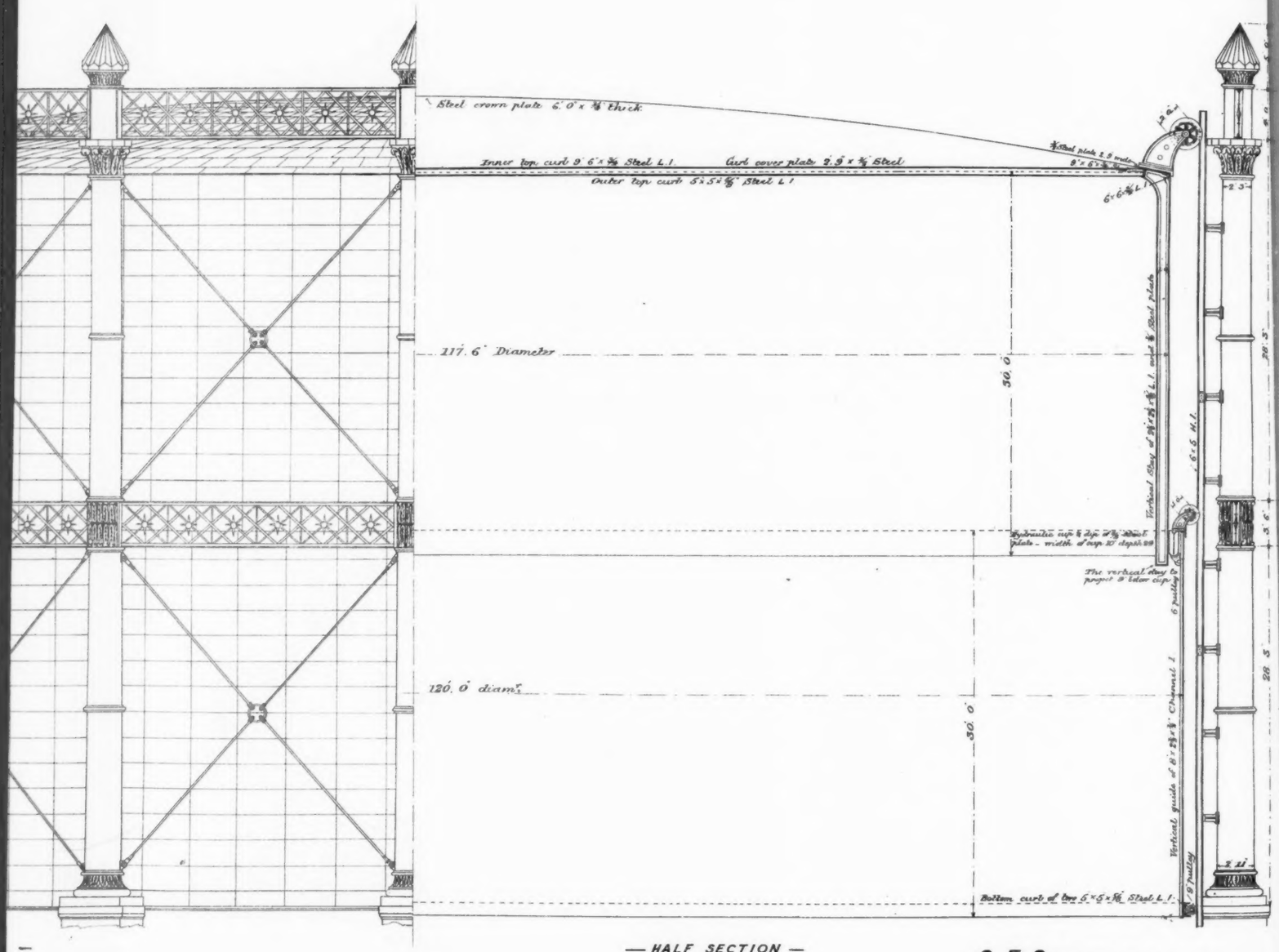


— HALF ELEVATION —

BUENOS AYRES CO-OPERATIVE GAS WORKS

TELESCOPIC GASHOLDER 120 FEET DIAMETER

Scale in Feet


Steel crown plate 6'0" x ⅜ Thick.
Inner top curb 9'6" x ⅜ Steel L.I.
Curb cover plate 3'9" x ⅜ Steel
Outer top curb 5"x5"x⅝" Steel L.I
117'6" Diameter
120'0" diam.
30'0"
30'0"
Bottom curb of two 6"x6"x⅝ Steel L.I.

— HALF SECTION —

G. E. STEVENSON, Engineer.

would give. The only figures he was in a position to deal with were those for 1889; and he hoped the Court would deal with them as the basis figures. Of course, he should make no objection whatever to the suggestion of Mr. Littler with regard to the fact of there existing at a particular time a probability of an increase or a reduction of expenditure; but if his friend was going into the question of what happened in 1889 and the coal contracts made in 1890, he (the Solicitor-General) should meet them by showing that the disturbance which existed at that time was temporary, and that they had reverted to their original position.

The CHAIRMAN remarked that, as a positive basis of valuation, he understood that the Solicitor-General objected to the accounts up to June of last year.

The SOLICITOR-GENERAL said he did so. He submitted that they should be the accounts for 1889, for two reasons, the first being that they were the accounts dealt with in the initial proceedings.

The CHAIRMAN said he knew they were the only accounts when the Overseers entered upon their work in May. He quite appreciated that position. But before the Overseers' duty was concluded, and long before the Assessment Committee had given their judgment, the accounts for the entire twelve months ending the 30th of June were extracted; and if Mr. Littler said that the Court should look at those accounts, they must ask themselves how, in common fairness, they could reject the proposal.

The SOLICITOR-GENERAL said he should not object to the Court looking at any accounts for 1890; but the respondents ought to be allowed to investigate what had taken place since 1889.

The CHAIRMAN said that was quite obvious; and he should be ready to accede to it.

Mr. LITTLER said he might perhaps be allowed to interpose to tell the Solicitor-General that those accounts, and all the Company's books, had been worked upon for weeks by his clients.

The SOLICITOR-GENERAL said that of course they had accountants at work upon the 1889 accounts, as they were bound to have, but not upon the 1890 accounts. In the notice of appeal in this case, the figures of receipts and expenditure there given were those for the year 1889. The appellants' case stated in paragraph 9: "The following is the estimate made by the appellants, and set out in order to give information to the Court of the net rateable value of the whole hereditament upon the Company's audited accounts for two half years for 1889." So that on Jan. 9, 1891, when the notice of appeal was given, the Company rightly took the two half years of 1889 as the basis figures.

The CHAIRMAN asked if he was to conclude from this that the Solicitor-General desired that the case should be restricted to 1889.

The SOLICITOR-GENERAL said he did not contend that they should be restricted, but that in the first instance they should deal with the accounts for 1889; treating subsequent accounts as modifications or as indications which should have been foreseen.

The CHAIRMAN remarked that this would lead to great complexity.

The SOLICITOR-GENERAL observed that all he could say upon that was that if Mr. Littler did not wish to put before the Court those figures——

The CHAIRMAN said it seemed to him that both parties were in an awkward position. The Solicitor-General would say that the Overseers were justified in basing their figures upon the 1889 accounts; and *primâ facie* there were no others before them. But after the expiration of the first half of 1890, the parties went before the Assessment Committee; and then what happened? There was a considerable increase. The Committee raised the valuation both gross and rateable, of this important hereditament. Could it be said, therefore, that they were to be precluded from saying: "You, yourself have raised it; you have obviously had regard to what has occurred since 1889." And would not the Court, acting impartially between the parties, be entitled to say: "Take as a positive basis the accounts terminating in June, 1890"? He thought they would; but the parties could do as they pleased.

The SOLICITOR-GENERAL said that in the appellants' case, to which he had alluded, Mr. Littler had asked him to refer to paragraph 11. All that they said there was: "For the year 1890, the appellants' accounts lately made up"—that was to December, 1890, after the Assessment Committee had dealt with the matter—"showed gross receipts £3,464,000, and expenses £2,550,000;" and so on.

The CHAIRMAN said they were somewhat careful not to give the half-yearly accounts, but the accounts for the whole year. Each side stated the case to its own best advantage; and the Court had to read between the lines. As he had said, the accounts showed an enormous increase in the gross receipts, and a diminution of one-sixth in the net receipts—a very startling proposition.

The SOLICITOR-GENERAL said he was anxious to deal with the matter quickly. He would listen to the figures, and take a note of the period to which they referred; but the respondents must have time to consider them.

The CHAIRMAN assented. He said the appellants had abandoned their case; and so, to a certain extent, there was ground of complaint. He should not overlook that fact, they might be sure.

The SOLICITOR-GENERAL said that things went up in the first half year, and down again in the second half year; and now the appellants were getting back by the South Metropolitan case. However, he should like to hear what figures Mr. Littler put before the Court.

The CHAIRMAN said he could not do it that day.

Mr. LITTLER expressed his willingness to give the figures. He said he might point out that in paragraph 10 of the appellants' case, it was stated that the appellants would contend that, at the time the valuation list was made, as well as before and since, there was to be anticipated, and there was in fact being incurred by the Company, considerably greater expenditure on labour, a rise in the price of materials and other matters, and a consequent decrease of the net receipts, notwithstanding the increase in the gross receipts, in respect of which matters they would seek further relief.

The CHAIRMAN said that this was an intimation to the Court that there would be supplementary lists for the years between the present year and 1896.

Mr. LITTLER said he proposed to give the information obtained from those accounts to June, 1890, and to furnish evidence as to the coal contracts which did not come into operation until June, 1890, and other matters which were known and presented to the Assessment Committee.

The CHAIRMAN said Mr. Littler really must take time to do that; and therefore it was impossible to proceed with it at this stage. He asked if there were any other legal points to be raised in the case.

Mr. LITTLER said he did not think there was anything beyond that which they had discussed.

The CHAIRMAN asked if they would proceed with regard to the plant and buildings in the other three parishes concerned.

The SOLICITOR-GENERAL said he could not deal with that matter until he knew the figures that Mr. Littler was going to put before the Court.

The CHAIRMAN said it was obvious the accounts must be freshly stated, and that each party should have an opportunity of going into them, and submitting, upon the authorities, that this or that was the right conclusion or the right calculation to be made upon the facts.

Mr. LITTLER remarked, with respect to the structures, that the Company accepted the actual amounts at which they were assessed.

The CHAIRMAN said if that were the case the appeals were confined to the mains and pipes; and both expense and time would be saved if the parties had before them the accounts up to June, 1890. If there was any question as to meter-rents, that could be argued then.

The SOLICITOR-GENERAL said at that moment he was waiting for Mr. Littler to open his case.

Mr. CASTLE: It is adjourned now.

The SOLICITOR-GENERAL said if Mr. Littler asked for an adjournment, he should apply for the costs of the day.

Mr. LITTLER said he was prepared to afford all information on the basis that the Court had decided; but he should object to the Solicitor-General asking for an adjournment, so as to pick it to pieces after he had finished.

The CHAIRMAN said it was rather the suggestion of the Court that the case should be adjourned; but, after what had fallen from the Solicitor-General, Mr. Littler must proceed. He could not assist them further.

Mr. LITTLER said he was willing to go on; but it must be understood that if he did so, they must complete the appeal then. It seemed to him that to open his case with the information which he would be able to afford, and which would have to be examined by officials on the other side, was really taking up the time of the Court. As his Worship had indicated what, in the view of the Court, should be the evidence to be submitted, he took it upon himself to ask his Worship to say that there should be an adjournment, and he (Mr. Littler) would take the responsibility of it.

The CHAIRMAN said he hoped his suggestion would be acquiesced in. He expressly stated that they must not lose sight of the fact that the opening of the appellants' case was practically an abandonment of it as it was stated; and therefore there was a case for the reconsideration of the valuation. This was not inconsistent with anything that had fallen from the Court in the South Metropolitan Company's case.

Mr. LITTLER agreed that it was not in the slightest degree inconsistent. They had now, he said, an indication of the opinion of the Court as to what was the proper legal bearing of the evidence about to be presented. That being so, inasmuch as the evidence in that shape was not ready for both sides, he thought the most convenient and most respectable course would be to have an immediate adjournment for the purpose of providing figures, and he hoped agreed figures. He therefore took it upon himself to ask his Worship to adjourn.

The SOLICITOR-GENERAL reminded his Worship of the enormous cost of proceedings each day in litigation of this kind. He said the respondents were there to meet the notice of appeal they had given, which referred to the figures for the year 1889, and further suggested that the indications shown by those figures were modified by the experience the Company had had since the end of that year. Those figures would raise certain questions which might, he thought, be promptly dealt with by the Court; but he most strenuously objected to any adjournment, now that he was no better informed than he was before. He asked that Mr. Littler, being there as the appellant, should state his case. If he stated the case which was indicated in the notice of appeal, he (the Solicitor-General) was prepared to discuss it; but if he stated another case, then the respondents should have time to consider it. But whichever case was put forward, he believed it would raise two or three questions which could be at once considered.

The CHAIRMAN said he had offered to hear any abstract matters argued. For instance, the question of meter-rents, or profits derived from the hire of meters, and one or two incidental questions, could be argued then, quite apart from mere figures.

The SOLICITOR-GENERAL said he might indicate one matter which stood very clearly inseparable from others. The Company, in the accounts tabulated in their notice of appeal, had deducted from the receipts certain amounts obtained by them from the treatment and sale of their residuals; and he understood that they contended that the trade in residuals was no part of the gas undertaking, and that therefore they were not bound to bring into their accounts, for the rating of the gas undertaking, the profit made upon the sale of their products.

Mr. LITTLER said the Company did not propose to raise that point.

The CHAIRMAN remarked that residuals—coke, for example—had always entered into the accounts.

Mr. LITTLER said he did not propose to raise any new point at all, because, on an examination into the figures, they found that it would not affect them.

The SOLICITOR-GENERAL said the proceedings in the last five minutes had been of immense value to them in dealing with this case, because in the accounts prepared for the appeal a very large sum—£39,000—was deducted in respect to the residuals, so that during that time they had reached £39,000 nearer to a total. But there was another question, which involved a great difference between them—viz., the question of interest upon tenant's capital. This they put at £1,750,000 gross, and the net at 17½ per cent.

The CHAIRMAN: That is the total, made up of 10, 5, and 2½ per cent. We have heard of these figures before.

The SOLICITOR-GENERAL said yes. That 17½ per cent. on £1,750,000

was rather more than £300,000; and, of course, that was an enormous sum to deal with. He should contend that 17½ per cent. had ceased to be a proper figure to allow for tenant's capital. The reduction which had notoriously taken place in the profits of industrial enterprise made it unreasonable that a tenant should be allowed 10 per cent. for trade profits, 2½ per cent. to cover casualties, besides the remaining 5 per cent., which went to make up the total amount.

The CHAIRMAN said, in order to assist the Solicitor-General, and to show that he followed his argument, possibly he would say that the risks and casualties should be properly included in the contingent rise of the price that is put upon the commodity.

The SOLICITOR-GENERAL: Certainly, and strikes also; and we are going to contend for a lower figure than 17½ per cent., and to ask the judgment of the Court upon it.

Mr. LITTLER said the Solicitor-General could be no nearer to this by the fact of his immediately opening the case. His friend knew that the appellants were going to claim the 17½ per cent., which had always been allowed; and he (Mr. Littler) hoped his Worship would not make the Company the first victims of any contrary doctrine.

The CHAIRMAN said they must hear what the other Counsel had to say on the matter; as 17½ per cent. might be proper, for there were many risks and casualties—explosions, escapes, and other things.

The SOLICITOR-GENERAL remarked that he could say no more on the matter; but he would at least ask that Mr. Littler should now either state in Court (which would be the most convenient way), or hand to the respondents, the figures with which they were going to deal.

Mr. LITTLER said he could not give them at present.

The CHAIRMAN suggested, with regard to the question of tenant's capital, that surely this was one of the points which might be considered then; because, having determined it, they would be able to set out the account in the proper form, according to the decision of the Court. It had always been usual, in stating the accounts of gas companies, to make an allowance of 17½ per cent.; and therefore the Solicitor-General might be called upon to give his reasons for decreasing the percentage. He asked if the respondents, in either of their cases, had stated that it was their intention to contend that 17½ per cent. was an excessive allowance.

Mr. LITTLER said that it had not been notified in any one of them.

The SOLICITOR-GENERAL observed that it entered into the general consideration of the case.

The CHAIRMAN asked if there was any difference between the parties as to meter-rents.

Mr. DANCKWERTS replied that there would be difference on this point, as they were all included.

The CHAIRMAN thought that he might ask the Solicitor-General to show why the Court should depart from the ordinary rule of allowing 17½ per cent.; reserving, of course, the right to Mr. Littler to call witnesses in answer. He thought they could proceed thus far; but the very amount upon which the percentage had to be calculated would have to be stated, and something might arise on the amount itself.

The SOLICITOR-GENERAL said that this would, no doubt, be so; and, of course, they would also have to go into the matter, to see what the statutable position of the Company was, as to their powers to deal with the increase in the price of gas, and so on, and as to the extent to which they had funds authorized by Parliament from which they were in a position to meet some of the risks in respect to which part of the 17½ per cent. was to be allowed. He was afraid that, without taking account of a great many of those matters, they could not deal with the question of the percentage separately.

The CHAIRMAN said it would have to be considered how far it was within their power to obtain the sum of £145,000 from the reserve fund for the purpose of keeping up the dividend, upon which might or might not depend the reduction in the price of gas.

Mr. LITTLER said the higher the dividend, the lower was the price of gas. If the Company had not done this, they would have been entitled to raise their price; but the shareholders had touched their own pockets in order to keep the price of gas low.

It was then decided to defer the consideration of the whole of the matters raised in the appeal until the amended figures could be put before the Court. An arrangement was entered into by which the appellants should have three weeks in which to prepare the figures and submit them to the respondents; that the respondents should then have three weeks for the examination of the accounts; and that thereafter an application should be made to the Court to appoint a day for the hearing of the appeals.

The CHAIRMAN said he would ask that the Court should be furnished with the views of both parties, and that both sides should state their cases and the figures with as much amplitude as possible. The cases at present before the Court were mere outlines and skeletons. He would not go so far as to say that they were evasive, though possibly that word might not be altogether inapplicable; but he had not read them with any proper satisfaction or enlightenment.

The case was then adjourned.

The "Campbell" Gas-Engine Company, Limited, have received from the War Office a repeat order for their engines.

Gas Affairs at Lancaster.—At the meeting of the Lancaster Town Council last Wednesday, Alderman Hatch, the Chairman of the Gas Committee, said with respect to the licence for the Committee's tar still, that the excise officers would have power to enter the premises whenever they thought fit. The Deputy Town Clerk was trying to get them off the payment of a large sum for back duty; and it was being considered at headquarters whether or not they were liable. The Committee hoped that they would not have to pay. They were about to erect a new tar still and also some additional retorts. It would be remembered that during last winter they had every retort in the place at work; and if the increase in the consumption of gas in the town advanced at the same rate as last winter, they would not be able to light the town during the coming winter unless they had extra retorts. They were, however, putting down as few as they could, in view of the probability that the electric light might relieve them of their responsibility to light the town.

MISCELLANEOUS NEWS.

BIRMINGHAM CORPORATION GAS AND WATER SUPPLY.

The Committees' Annual Reports.

At the Meeting of the Birmingham City Council last Tuesday—the MAYOR (Mr. Alderman Clayton) presiding—the annual reports of the Gas and Water Committees, summaries of which were given in the JOURNAL last week, were submitted for adoption.

Alderman POLLACK introduced the report of the Gas Committee, and moved—"That the Gas Committee be authorized to appropriate out of the profits of the Gas Department for the year ended March 31, 1891, the sum of £30,000 to the credit of the improvement rate of 1890, and to add the sum of £45,256 8s. 10d. to the sinking fund." He said that the accounts presented dealt with two periods—the first quarter of 1890, and the financial year ended March 31 last. The surplus profits of the shorter period were even a trifle higher than those of the succeeding twelve months, although the latter, taking all circumstances into consideration, were satisfactory enough. The profits of the first three months were satisfactory owing to cheaper coal and dearer coke. When the Committee presented their report twelve months ago, the Council permitted them to pay their contribution to the improvement rate out of the profits of 1889, so that the balance of £38,471, which they held in reserve owing to the uncertainty of the results of the then forthcoming financial year, could be now disposed of, and the resolution recommended that it should be transferred to the sinking fund. During the past year the profits earned, subject to the usual deduction for payments of annuities, interest, sinking fund, &c., were £131,246. They compared unfavourably with those of 1889, which were £165,124, or £33,878 more. Yet the Committee had reason to be satisfied; for during the last nine months they had had to deal with an additional expense for coal, which, after taking into consideration the additional amount distilled, was no less than £60,000. The advance in the price of coal since 1888 had been appalling. In 1888 the average price paid by the Corporation was 8s. 8½d. per ton; in 1889, it was 9s. 4d.; and during the last nine months, it had been 11s. 10½d., and would probably have been more, had not the Committee been able to a certain extent to out-manœuvre the ring formed by the coal-owners. An advance of 3s. 2d. per ton on a consumption of 421,000 tons was not easy to face; and they had been able to face it only because of the enhanced price of coke and the large increase in the sale of gas. The augmented expense, however, was not in coal only. Owing to the adoption of eight-hour shifts in the retort-houses, the wages bill had vastly increased. In 1888 the wages paid to the men in and about the retort-houses were £35,000; in 1889, they were £41,000; and during the past financial year, they had been £53,000. Other departments included, the total additional cost of wages in that period had been £17,375 in excess of the amounts paid previous to the adoption of shorter shifts. This did not mean that the same men received so much more money; but that, owing to shorter hours of labour, the Committee had had to employ a much larger number of men. The salaries had increased from £19,166 in 1888 to £19,984 last year. But if the additional output of gas was taken into consideration, these salaries were not only no higher, but practically a trifle lower than heretofore. There had been a decrease of nearly 50 per cent. in bad debts. The sales were £21,500 more during the year than in 1889, or nearly 5 per cent.—owing, no doubt, to severe weather in January and December. The department's maximum weekly output had been 141,125,000 cubic feet for the week ended Dec. 18; whereas previously the largest consumption had not exceeded 127,412,000 cubic feet. They had had three consecutive weeks during which the resources of the department were taxed to the utmost, and to such a degree that during one evening the quantity of gas in stock was alarmingly small, while on two other evenings it was necessary for the engineers to reduce the usual pressure, or the town might have been left in darkness. This unexpected strain on their productive power had necessitated immediate measures; and hence the contracts mentioned in the report. The residuals had also yielded a very large increased income, especially coke, which had given them £30,000 more than in 1889. But whilst there was almost a certainty of a reduced income from coke, there was no certainty whatever that the coal bill would be less next year. Last year they dealt successfully with an increased expenditure for coal and wages amounting to £80,000. This year they would have to deal with an additional outlay for a new system of purification, which would vastly increase the cost of manufacture. They would also have to provide the interest on the new plant which they were to fructify in the future. Nevertheless they would try to sell gas at the same price; for they hoped it would not be necessary to follow the example of twenty-two towns which during the past few years had increased their prices—Leeds by 4d. per 1000 cubic feet; London, Dublin, Edinburgh, and Northampton, by 3d.; Bristol, by 5d.; Barnsley, by 4d.; and Nottingham, by 2d.—in fact, but for the large increase in the cost of coal, they had hoped both to reduce prices, and to make some alteration in the differential charges. As to the capital expenditure, Mr. Pollack pointed out that the amount spent upon the works up to the end of March was £2,178,406—*i.e.*, not quite 9 per cent. over the original cost of the works; whereas their output had increased 62 per cent., from 2386 million to 3810 million cubic feet. As against the increased capital expenditure, they had in hand a reserve fund of £100,000, and a sinking fund which would amount to £365,301 when the resolution before the Council had been approved. So that their present indebtedness for a plant producing 60 per cent. more was £287,800 less than it was at the time of the transfer. As to the addition to the sinking fund, that was made all the more necessary by the fact that during the previous five years the Committee had been unable to make any extra contributions to it, and that the market capital value of their annuities had increased.

The resolution was seconded and agreed to.

Alderman POLLACK then moved that the Committee be authorized to make to Mr. D. P. Mudie a retiring allowance of £100 per annum upon his resignation of the position of Superintendent of the Swan Village gas-works. He said that Mr. Mudie had worked 23 years for

the Staffordshire Gas Company and 15 years for the Corporation; and he had an unblemished record. At present he received £350, in addition to house, coal, and gas.

Mr. GRANGER in seconding the motion, said he did not approve of superannuation in such a case; but his constituents who were gas workers said he deserved it, and they hoped the Committee would be generous enough to extend the principle all round.

Mr. BEALE said that the Sub-Committee of the General Purposes Committee appointed to consider the subject of pensions found that, under the Consolidation Act, the Council must either have a fund certified by an accountant and managed by a staff specially appointed and paid, or deal with pensions as the need for them arose. In the latter case the difficulty was that future Committees could not be bound to continue the practice of granting them. Otherwise he did not see why the same principle should not be applied to a workman who had worked well as to a Superintendent. The amount granted should depend upon the length of time the man had worked, and the way he had worked.

Mr. THOMASON said he did not see that there was any reason to establish a difference between Mr. Mudie and the workpeople, unfavourable to the latter, especially when they had not been paid, as Mr. Mudie had, at such a rate as to enable them to make provision for themselves. He moved as an amendment that Mr. Mudie be presented with £100.

Mr. BRINSLEY seconded the amendment, which was supported by two votes only; the resolution being thereafter carried unanimously.

Alderman POLLACK next proposed the increase of the salary of Mr. H. Powell, Assistant Secretary to the Gas Committee, from £300 to £350 per annum. Alderman Sir THOMAS MARTINEAU supported the resolution, and it was carried unanimously.

Approval was also given to an increase in the salary of Mr. S. R. Barrett, Superintendent of Fittings Department, from £300 to £350.

Alderman POLLACK, in moving approval of the Gas Committee's report, again referred to the pressure of the demand experienced by the Gas Department during last winter, and to the measures which the Committee were taking to meet the increased consumption. Assuming that the present rate of increase continued, the maximum weekly output required four years hence would be 168 million cubic feet, or 27 millions more than at the present time. To provide for this, the Committee had authorized an expenditure at the Saltley works which would increase their powers of production by 1½ million cubic feet per day. They had also authorized an expenditure at Windsor Street, whereby it would be possible to complete the new retort-house within the next two years, when those works would be able to produce an additional quantity of gas equivalent to 3½ million cubic feet per day; making altogether an increase of 5 million cubic feet, which ought to enable them to cope with any emergency likely to occur within the next four or five years. The various contracts for these works amounted to something under £60,000, which, in proportion to the increased capacity thereby gained, was a very low figure, being only about £12,000 per million cubic feet of gas per day. The Committee had also authorized an expenditure on additional purifiers, which would enable the engineers to considerably reduce the sulphur compounds in the gas without decreasing the illuminating power. In conclusion, Alderman Pollack referred to the reduced terms which the Committee had offered in order to increase the sale and employment of gas cooking-stoves in the city and district—a department in which Birmingham had been considerably behind many other large towns, but which was increasingly important in view of the competition of the electric light as an illuminant. He hoped that the inducements which the Committee had offered, in the way of opportunities for trial, and payment by instalments, would lead to a large increase in the employment of cooking-stoves.

Mr. GREEN seconded the resolution.

Mr. TOWLER referred to the question of Sunday labour at the gas-works, and said he understood that, while time-and-a-half was paid for Sunday work to those operatives who were paid by the day, the concession was not made to those who received weekly wages. He thought this was an inequality which ought to be remedied, and which, if they looked into the matter, the Committee would be willing to remedy.

Mr. GRANGER said that he was only recently in conversation with the Secretary to the Gas Workers' Association; and he had heard of no such grievance as that mentioned by Mr. Towler. On the contrary, he was informed that everything was going on satisfactorily.

The MAYOR wished to state that formerly he used to sympathize somewhat with the badgering which the Gas Committee used to meet with in the Council; but a longer experience of their operations, and more intimate knowledge of their work, convinced him of the admirable esults which they had brought about. Their finances were in a sound condition, which was a great credit to them. He found that, whilst they had increased the make of gas since the works had been taken over by 62 per cent., their outstanding capital account had been reduced by 3 per cent. He did not think that any company could point to such a result as that. Including the £30,000 which had just been voted, they had contributed a total of £400,000 in reduction of the rates; whilst they had also increased their reserve fund and sinking fund so far in excess of the statutory requirements, that he understood from the Secretary that those funds were as large as they need be without any further addition for the next twenty years. Beyond this, they had been enabled to reduce the price of gas 10½d. per 1000 cubic feet since the department was taken over. It was true that in London they had done practically the same thing; but they had very largely increased their capital, which the Birmingham Corporation had not. Considering the uncertainty as to the future of gas and every other illuminant, he thought the Committee had adopted a wise policy in adding largely to their reserve; and that this was far better than attempting to obtain a mere temporary popularity by decreasing the price of gas to the very lowest point—a thing which would not be appreciated after the first week or two, and which might land them in very serious trouble in the future. He congratulated the Committee on their having the services of two such able Engineers as Mr. Hunt and Mr. Hack. There was only one direction in which he thought something more ought to be done. He did not think that chemistry received so much attention in connection with gas manufacture as was desirable; and he was inclined to believe that the employment of a first-class chemist, devoting his whole energies to the problem, might result in finding a way out of difficulties connected with the purification of the gas, and the stoppage of the pipes with naphthalene. This was a work special to the chemist rather than to the gas engineer, however well qualified the latter might be. He considered that the greater purification of the gas was the matter which now most demanded attention; and he was sure the public would sooner pay an extra 1d. or 2d. per 1000 feet, if they could get a purer article and free from those sulphur compounds which were such an abomination in their houses.

Alderman POLLACK, in reply, said the appointment of a chemist had been considered by the Committee; but there were certain difficulties in the way. They had very good chemists at present at the two principal works, who worked in harmony with the engineers; and it would hardly be wise to appoint a chemist who did not work in harmony with them. He was grateful, however, to the Mayor for having brought the matter forward, because he believed that the Council would willingly support the Committee in making the appointment of a trained chemist. The matter would have the attention of the Committee, who would deal with it in a manner which would secure the approval of the Council. In reply to other questions, he said he was not aware of any cases of people not being paid for Sunday labour. If Mr. Towler knew of any, and would lay the matter before the Committee, it would be dealt with.

The resolution was carried.

The report of the General Purposes Committee was next introduced by the Mayor, who proposed that Dr. W. A. Tilden be appointed Examiner for the purpose of securing independent tests of the gas distributed from the Corporation Gas-Works for one year, at a salary of £200. He said the object was to secure the services of a gentleman of such standing in the city that it would be felt that his reports were thoroughly independent and entirely above suspicion of having been tampered with. He made no reflection on anything that had been done in the past; but they could not make any appointment which would be so free as Dr. Tilden's from any suspicion of collusion or anything that was not perfectly straightforward.

Alderman POLLACK seconded the resolution, which was carried.

On the report of the Water Committee coming before the Council,

Sir THOMAS MARTINEAU moved that the alterations with respect to plumbing work recommended by the Committee be approved. He said the change was one wished for by the plumbers. It was desirable that the plumbers and the Water Department should work harmoniously; and he believed that the change proposed would tend to this harmonious working, and that on the whole the Committee would not lose by it.

Mr. SMITH seconded the motion, observing that he thought the Committee should not compete with the outside trade. The plumbers had certainly had a grievance, and the proposals of the Committee would remove it.

The motion was carried.

Sir T. MARTINEAU then moved that the Committee's report be approved; and he entered into a short analysis of the balance-sheet for the fifteen months ended March last. The great increase in the working expenses there shown was due, he said, to three causes—the advance in the price of coal (which was alone responsible for £3700), the prolonged and severe frost of the past winter, and the increase in the wages of the workmen employed by the department. Under these circumstances, he considered the profit of £2485 very satisfactory.

The resolution was seconded by Mr. SHAMMON, and approved.

RAMSGATE CORPORATION GAS AND WATER SUPPLY.

The Annual Report—The Oxygen System of Purifying Gas.

At the Meeting of the Ramsgate Corporation Gas and Water Committee last Thursday week, the report on the working of the gas and water undertakings during the year ending March 25 last were presented.

The portion of the report dealing with the affairs of the Gas Department stated that during the year a loan of £4000 was received from the Prudential Assurance Company. This brought the total amount of loans up to the limit of existing borrowing powers, until the Provisional Order at present before Parliament was sanctioned. The expenditure on this account in the twelve months was £2367, which left a balance of unexpended capital in hand amounting to £4227. The sale of gas during the past year showed an increase on private rental of £1353; and public rental of £41—making a total of £1394. Residual products realized £463 more than in the previous year. The expenditure on coal and other expenses to produce this revenue amounted to £17,401; leaving a balance of £6965 17s. 3d. to be carried to profit and loss account. After paying income-tax and interest on loans, amounting to £4110, and placing to the sinking fund the sum of £448, there remained a balance of profit amounting to £2407 to be divided between the ratepayers and the consumers, being £1049 more than last year. A moiety of this amount—viz., £1203 would be paid to the district fund; and the remaining half, together with the balance of undivided profit in hand belonging to the consumers, amounting to £156, made a total sum of £1359 due to the consumers. The report also stated that the total value of the cooking-stoves let out on hire by the Corporation to March 25 last amounted to £1093. The hire paid on these—viz., £187—had been written off, leaving the sum of £906 standing as their value in the general balance. As with the fittings on hire under the prepayment system, the total amount expended by the Corporation on this account to March 25 was £758, from which had been written off the amounts received for hire—viz., £170—leaving the sum of £588 standing as their value in the general balance. It was mentioned that the number of consumers at present under this system was 414. As to the affairs of the Water Department, it was reported that the water-rental during the past year amounted to £8494, or an increase beyond last year of £108. The expenditure amounted to £3397, or an increase of £214; leaving a balance of £5190 to be carried to the profit and loss account. From this amount there had been paid: Interest on loans and income-tax £3980, and an instalment to sinking fund of £540 leaving a balance of £669 as the net profit on the

year's working. Before arriving at this amount, the sum of £500 had been provisionally placed to the depreciation fund out of the year's profits. The amount standing to the credit of profit and loss account was therefore as follows: Balance from last year, £84; net profit on past year, £669; making a total of £754. The gross profit made on the two undertakings during the year was, therefore: Gas, £6966; water, £5190—total £12,156.

Mr. BURROWS, the Chairman of the Committee, in moving the adoption of the report, said he thought that every member of the Council would consider it very satisfactory indeed, both as regarded the gas and the water department. Drawing attention in the first place to the gas accounts, he said it would be seen that they had this year a considerable increase in the amount of profit over what they had in hand last year. The exact amount of profit which they had to divide in the usual way was £2407—that was, after £4110 had been devoted to the interest on the borrowed account, and £448 to the sinking fund. The division of the profits to the ratepayers and consumers was made under Act of Parliament. In accordance therewith, each consumer would receive a sum equal to 3d. per 1000 cubic feet as a rebate on the amount of gas he burned. The ratepayers again would receive a rebate on the district rate of very nearly 3d. in the pound. He thought everybody would agree with him when he said that this was a satisfactory state of affairs. The gas-works were in a profitable and efficient condition. The working statement showed that the exact profit per ton of coal carbonized during the year was 10s. 11¾d. per ton. As a matter of interest to the members, he had with him some figures showing the profit per ton of coal carbonized in the case of the three London Gas Companies. The profit of The Gaslight and Coke Company was 10s. 4¼d.; of the Commercial Gas Company, 9s. 10d.; and of the South Metropolitan Company, 7s. 9½d.—showing that the Ramsgate Gas Department was in a better position than the London Companies. As to the new scheme for supplying gas to small consumers, 414 had been supplied up to the present time; and they were gradually receiving back sums of money to recoup the amounts expended on the fittings. With regard to the Water Department, it would be remembered that, for years after being taken over, the works did not pay. During the last two years, however, there had been a small profit; and this year there had been a continued increase in that profit. After paying the interest on borrowed capital, £3980, and £540 to the sinking fund, they had a total balance to go on with of £754. They had nothing to hand over to the consumers; but the balance would be very useful in repaying the amount of overdrawn capital. It was satisfactory to think that the water-works were paying, and that they were beginning to develop a profitable undertaking. He had heard it said in the Council many times, and also outside, that the gas and water departments—especially the gas—were not paying concerns, and that it would be a good thing if they were sold. It seemed to him that works which produced profits enabling them to reduce the price of gas to the extent of 3d. per 1000 cubic feet, and give a rebate off the district rate of 3d. in the pound, formed a very good investment indeed, thanks to the officials, who, in so excellent a way, supervised the works. During the short time he had been Chairman of the Gas and Water Committee, in applying for any information from Mr. Valon, Mr. Cockburn, or others at the works, nothing had been withheld—everything had been open to inspection; and any member who desired to do so, could get all the information he wished.

Mr. GWYN, in seconding the motion, said he cordially indorsed what Mr. Burrows had said in regard to the officials. Everything pointed to progress as the result of careful management.

The motion was unanimously adopted; as was also the following recommendation from the Gas and Water Accounts Committee: That the balance-sheet and working statement, as presented by the Accountant, be recommended for the acceptance of the Gas and Water Committee; and the balance of net profit, £2407 2s. 8d., be divided in equal proportions—one-half to be allowed to consumers as rebate on their Michaelmas accounts to the rate of 3d. per 1000 cubic feet of gas consumed during the year ended March 25, 1891; the remaining half, £1203 11s. 4d., to be paid over to the district fund in aid of the next rates.

On the subject of the purification of the gas, the Engineer (Mr. W. A. Valon) reported as follows: "The purification of gas during the year has been satisfactory. The standard of purity has been maintained at 10 grains of sulphur in 100 cubic feet; and the illuminating power at the high point of 16·95, or nearly 17 candles, for the whole year. This has been arrived at with the aid of lime and oxygen, without causing any inconvenience or nuisance of any kind in the neighbourhood of the works, notwithstanding the fact that we had spent lime for the whole year stacked on the premises. The total cost of purification for 1890-91 has been £447 17s., compared with £476 1s. 6d. for 1889-90. In 1890-91, therefore, we purified 13 million cubic feet more gas at the same cost as in 1889-90. Your present purifiers are four—14 ft. by 14 ft. by 4 ft. 6 in. deep. This is not sufficient space, and increased economy will be the result of enlargement. I mention the fact, however, to show the confined space in which good purification may be accomplished by the aid of oxygen, although such extremely narrow limits are not advisable. The annual payment on outlay for plant and royalty is £90 15s., to repay capital and interest in 30 years. As the Committee are aware, until oxygen became available, we purified by oxide of iron, only using 1 per cent. of air and 2½ per cent. of cannel coal, to obtain an illuminating power of 15·6 candles. In 1890-91 lime was substituted for oxide, oxygen for air, and no cannel has been mixed with the coal; the result being that a higher illuminating power has been steadily maintained, and the standard of purity kept at 10 grains, without what might fairly be called a variation. No doubt a great part of the gain in illuminating power has been the result of the complete elimination of the carbonic acid from the gas by the use of lime. But the oxygen has further increased this advantage; and without it, lime purification would have been rendered impossible by the intolerable nuisance arising from ordinary lime purification with or without air—2½ per cent. of cannel coal would have cost the department £700—viz., 315 tons at 45s. per ton. This amount has not been an entire saving, as the gas made from it would have been sold; one-half, however, or £350, may be fairly claimed. The average quantity of oxygen used for purification throughout the year was 1 per cent. One-half of this would be used up in the boxes; the remaining half would pass on and be metered, bringing an additional sum as rental—650,000 cubic feet, at the cost our gas is made at (viz., 2s. 2½d. per 1000 cubic feet), would amount to £72. In addition, we have pushed our distillation to obtain 400 cubic feet per ton more out of the coal. This, on our carbonization of 12,681 tons represents 5,072,000 cubic feet, which, at our manufacturing price of 2s. 2¼d. per 1000 cubic feet, equals £560. These amounts, together with the amount for the purification of an additional 13 millions, make a saving to the department of £982 for the year, as comparing past purification by oxide of iron and substituting lime and oxygen, which means the sulphur compounds have been reduced from 37 grains to 10 grains. A further important point, however, must not be overlooked—viz., the benefit conferred on your consumers by supplying them with a gas of an illuminating power of 2 candles in advance of previous years. This, at our selling price, would average 2d. per candle, or 4d. per 1000 cubic feet. Taking it at one-half, or 1d. per candle, it is represented by a sum of £918."

Mr. BURROWS, in moving the adoption of the report, remarked that it was very satisfactory to find that there was no nuisance arising from the new works introduced for the purification of gas.

Mr. GREEN seconded the motion, and it was adopted.

WEST BROMWICH CORPORATION GAS SUPPLY.

Annual Report.

The report of Mr. T. Hudson, the Secretary of the West Bromwich Corporation Gas Department, for the year ending March 31 last, has just been issued. Although the net profit realized is not so large as in previous years, yet the result of the year's transactions is a substantial gain; and the difference in the amount of profit made is attributable solely to the high price of coal. The year 1890 was pre-eminently one of dear coal; and the expenditure under this head alone was increased from £9935 in the previous year to £13,568. As the increase on the quantity of coals used was only 1467 tons, it will be seen that the high prices of material were responsible for the greater proportion of the extra expenditure. While in other places the effect of this advance in coal has been to compel gas companies to make a corresponding increase in the charge for gas, the Gas Committee have reported the price at the same figure as before. The loss under the head of coal has been partly made up by the advance in price of coke and other residuals. Another extra charge has arisen from the fact that the working hours of the retort-house men have been reduced from twelve to eight per day; the additional cost being put at £888. It is rather surprising to learn that of 11,769 houses in the borough, only 4722 are supplied with gas; and the remark of the Secretary that there is a large field open for the operations of the Committee is fully justified. During the year no additions have been made, says the report, to the borrowing powers of the department, which still remain at £174,955. The loan capital on March 31 stood at £161,280; this being the amount in actual employment. Three loans on mortgage, amounting to £11,000, have been paid off during the year; and in order to replace two of the number, a sum of £9000 of West Bromwich Corporation 3 per cent. stock has been transferred to the Committee, and a further sum of £5000 has also been obtained from the Stock Department for additions to and extensions of the distributory plant. A loan of £2000 (part of £11,000) has been paid off through the sinking fund; making a total of £11,800 redeemed through the operations of this fund since the commencement of the undertaking. The total amount of the Corporation stock now allocated to the department is £45,580. The sum remaining to be borrowed is £1875, which is the unused balance sanctioned by the Local Government Board in 1887 for extensions of the distribution system. With regard to the capital expenditure, the total outlay on this account during the year was £838, of which £250 was paid for a plot of land adjoining the works (purchased to ensure the safety of the gasholders by stopping the working of coal on the land); the remainder of the expenditure being for extensions of the distributory plant. The total amount now expended on capital account is £173,365, which is equivalent to £8 6s. 8d. per ton of coal carbonized, or £806 3s. 3d. per million cubic feet of gas made. The sales of gas during the year showed an increase of 6 per cent.; and the income from residual products also exhibited an increase, with the exception of ammoniacal liquor. The income from the sales of gas to private consumers and from public lighting amount to £25,539—being an increase of £1105. The new consumers were about 100; making the total number on March 31, 4973. The quantity of gas consumed was 187,246,600 cubic feet, or at the rate of 37,653 cubic feet per consumer. The receipts from coke and breeze amounted to £7777—an increase over the previous year of £1651, due to the higher prices obtained. The receipts from tar showed an increase of £21; but for ammoniacal liquor there was a decrease of £157, notwithstanding an increased production. This falling off was due to the depressed state of the market; the average price—£11 4s. per ton—not having been so low since 1886. The revenue from gas-fittings and stoves was £106 below the previous year, owing to a decrease of business. The receipts from all sources, after deducting miscellaneous items, amounted to £36,983, as compared with £34,393 in the preceding year—an advance of £2589. The total expenditure came to £27,804, as compared with £23,768 in the previous year—an increase of £4035. The cost of manufacture was £20,742, against £16,247—being an increase of 3s. 1·62d. per ton of coal carbonized. The net cost of coal for gas-making purposes was £13,412, as against £9509; or an increase of £3903. The total cost of coals delivered into the works was £13,568, or an increase o £4058; the cost per ton of coal carbonized being 13s. 0·54d., as against 10s. 3·33d.—an increase of 2s. 9·21d. per ton. The cost of fuel for firing retorts was 1s. 9·35d. per ton of coal carbonized—an advance of 2·16d. per ton. The cost of purifying the gas was £450, compared with £332—an increase of 1d. per ton of coal carbonized. The wages in the carbonizing department amounted to £3025; being an increase of £545—equivalent to 4·13d. per ton of coal carbonized. The increase, as already explained, was due to the adoption of the eight-hour shift, which alteration took place at the

end of October, 1889. Comparing the cost per ton of coal carbonized in the year ending March, 1891, with that of the year 1889, the expense of the alteration is 10·25d. per ton; or, in money value, £888. The cost of repairs, maintenance, and renewal of works and plant was £1334, compared with £1443—a reduction of £105. The sundry manufacturing charges came to £238. The coal and cannel carbonized during the year was 20,802 tons, compared with 19,335 tons—an increase of 1467 tons. The cost of distribution amounted to £1396, a decrease of £202, due to lower charges in repairs and maintenance in both mains and meters. The quantity of gas unaccounted for was 11,954,300 cubic feet, as against 9,832,800 cubic feet; being 5·56 per cent. on the make. The expenses of lighting, extinguishing, cleaning and repairing public lamps were £620, against £564 in the previous year; the number of public lamps now in the borough being 858. The payments in respect of rent, rates, and taxes were £1467—an increase of £37. The total management charges were £1052, against £1430—a decrease of £377. The bad debts incurred during the year amount to only £8 17s.—a reduction over the previous year, notwithstanding that the system of paying deposits as security has been abolished. The balance of income over expenditure was £9266, compared with £10,714—a decrease of £1448. The year commenced with a balance to the credit of the profit and loss account of £10,422. The Council sanctioned the transference of £1000 to the general district fund account in aid of the rates, and £1000 to the depreciation fund account; leaving a balance of £8422, which together with the profits of the last year, give a balance to the credit of the account of £17,688. From this sum the Committee have discharged the statutory obligations in respect of the year, and a sum of £1825 only remains as representing the net profits or surplus for the year. The balance standing to the credit of the account therefore at the end of the year is £10,247.

Appended to the report are a number of tabulated statements concerning different accounts; and from these we gather that the quantity of gas made in 1880-1 was 125,867,000 cubic feet, compared with 215,050,000 cubic feet last year. The consumption in the public lamps in 1880-1 was 5,456,000 cubic feet, and last year 14,073,000 feet. The total quantity sold in the same periods was 118,603,000 feet and 201,319,700 feet respectively; while the percentage on the make was in 1880-1 94·1, and last year 93·61. In 1881-2 the expenditure was £18,919, as compared with £27,804 last year; and the income during the same period was £29,622 and £37,071 respectively. The total profit on the undertaking from 1880-1 has been £105,347; and from this the following appropriations have been made: Interest on mortgages and stock, £63,712; sinking fund for redemption of loans and stock, £11,745; transferred to relief of general district rate, £16,641.

TIPTON LOCAL BOARD GAS SUPPLY.

Annual Statement of Accounts.

The accounts of the Gas Department of the Tipton Local Board, and the report of the Manager (Mr. Vincent Hughes), for the year ending March 25 last have just been issued. Mr. Hughes states that the year was in every way exceptional, alike in the demand for gas, as well as the increased cost of materials and labour. The amount of gas sent out was 86,729,943 cubic feet; being an increase of 3,037,523 feet over the previous year. The quantity of coal carbonized was 8428 tons—an increase of 351 tons; but the cost shows an advance of £1162. The fuel used exhibits a further increase of £49, in addition to an extra quantity of coke used. The cost of purification is rather more than £50 in excess of the previous year; while the wages at the works amount to £1387, being £453 more than in the previous year. The returns for gas sold amount to £9526; being an increase of £192. Coke and other residuals have increased by £647. These items, however, are not sufficient to meet the considerable advances above-mentioned; and consequently the returns show a slight excess of expenditure over receipts. However, with the new plant now in course of erection, and other contemplated improvements, Mr. Hughes trusts to be able, in the coming year, to fully meet the expenses, without increasing the price of gas, as has been found necessary in many of the neighbouring towns. The report mentions that special expenses have been incurred during the past year for new cylinders for engines, lifting gear for the purifiers, and repairs to the station-meter. These items should have been drawn from the reserve fund; but it was considered advisable to charge them to the revenue account. Turning to the accounts, it is seen that the revenue amounted to £13,268, which was made up as follows: By sale of gas, £9151; residuals, £3976; and sundries, £141. The expenditure was as follows: Manufacture cost £8305; distribution, £406; public lamps, £811; and management, £280—leaving the gross profit at £3465. In a statement as to the manufacturing department at the end of the accounts, it is shown that during the year 8428 tons of coal and cannel were carbonized, from which 86,711,071 cubic feet of gas were made—being an average production of 10,289 per ton of coal. The gas sent out from the works amounted to 86,729,943 feet. The quantity sold and used on the works was 78,739,280 feet; the leakage, condensation, &c., being responsible for 7,990,663 feet, or 9·21 per cent. The average illuminating power was 17·59 candles.

Messrs. Alder and Mackay intimate that they have moved into the new and larger premises they have been lately erecting; and that their address now is New Grange Works, Edinburgh.

Issue of Additional Stock by the Yeadon Water Company.—At Yeadon, yesterday week, Messrs. Walmsley and Sons offered for sale by auction £8765 of stock in the Yeadon Water-Works Company; being part of the additional capital of £28,000 authorized to be raised by the Yeadon Water Act, 1889. The maximum dividend on the new stock is limited to 7 per cent. per annum; while the maximum dividend on the previous capital is 10 per cent. £1200 of stock was sold in 89 lots of £10 each, four of £15, one of £50, and two lots of £100. Five of the £10 lots sold at a small premium; and the remaining lots realized their nominal value.

BUXTON LOCAL BOARD GAS SUPPLY.

Reduction in the Price of Gas.

At a recent Meeting of the Buxton Local Board, the accounts of the Gas Department for the year ending the 25th of March last were under consideration. The Gas Engineer and Manager (Mr. G. Smedley) reported that the gas produced in the twelve months was 54,680,500 cubic feet. Of this quantity 47,047,600 cubic feet were distributed to the consumers; 4,948,000 cubic feet used for the public lighting, 636,700 cubic feet for works, shops, cottages, &c.—making altogether 52,632,300 cubic feet, and leaving 2,048,200 cubic feet, or 3·979 per cent., unaccounted for. The coal carbonized was 1479 tons 7 cwt.; cannel, 3729 tons 12 cwt.—total, 5208 tons 19 cwt. The average quantity of gas produced per ton was 10,498 cubic feet, of which 10,104 cubic feet were distributed. The amount of rental was £7841 5s.; estimated for lamps, £738 16s. 2d.—total £8580 1s. 2d. The average return per ton of coal used was £1 12s. 8¼d. The cost of coal and cannel was £3838 16s. 3d.; being an average of 14s. 10½d. per ton, and 1s. 5d. per 1000 cubic feet. Comparing these figures with those for the previous year, Mr. Smedley pointed out that there was an increase in the quantity of gas produced of 3,388,200 cubic feet, in the gas distributed of 4,854,600 cubic feet, and in cash of £815 13s. 7d. The increase in the production represents 8·93 per cent.; in distribution, 9·22 per cent.; and in the cash, 9·39 per cent. The average production of gas per ton was 158 cubic feet less; the average distributed, the same within a foot. The return per ton was 3¾d. more, and the cost into the holders less. The Chairman of the Board remarked that the Finance Committee recommended that the price of gas should be reduced from 3s. 4d. to 2s. 9d. per 1000 cubic feet, with a discount of 10 per cent. for prompt payment. The result of the year's working had been very satisfactory, as they had a profit of £1439 after paying £2487 for interest, sinking fund, &c. He moved that the price of gas be reduced as recommended. Mr. Hulme seconded the motion. Mr. Cooper, in supporting it, said he thought the Gas Committee and Mr. Smedley ought to be congratulated for the way in which everything connected with the gas-works had been conducted during the past year. The Chairman said he had been connected with the works since 1860, and he had always had the idea that the price of gas should be brought down to 2s. 6d. per 1000 cubic feet. He was therefore pleased to be in the chair to make the proposal he had submitted, which he was sure must be satisfactory to everybody. The motion was agreed to.

HEYWOOD CORPORATION GAS SUPPLY.

A New Holder—The Annual Balance-Sheet.

At the recent Quarterly Meeting of the Heywood Town Council—the Mayor (Mr. Alderman J. Cronshaw) presiding—the Gas Committee submitted minutes which showed that the Gas Manager (Mr. W. Whatmough) had presented a report embodying the recommendations of a Sub-Committee appointed to consider the question of purification and storeage capacity; and it had been resolved that the Borough Engineer and the Gas Manager should prepare specifications for a new holder on the principle of those now in use at the works, and also for one on the principle patented by Messrs. Gadd and Mason. The balance-sheet, showing the results of the working of the gas undertaking during the past year, was also submitted. It appeared therefrom that there was a profit of £901; and it had been agreed by the Committee that the sum of £150 (the amount expended during the year on capital account) should be taken therefrom and placed to the credit of the capital account, that the sum of £500 should be taken to the credit of the reserve fund, and that the balance remaining (of £251) should be carried to the credit of the district fund in aid of the rates for the year ending March 25, 1892.

Mr. Lawton moved the confirmation of the minutes. In referring to the annual report, he said it was not, in one sense, satisfactory to see the profits less than those of the previous year; but that dissatisfaction was removed if they looked at the reasons given in the Manager's report. Considering the small growth of the population, the increased make of gas in ten years, by 19 million cubic feet, was very satisfactory, together with the increase of 20 million feet in the amount sold. During the past two years, however, they had reduced the price of gas 5d. per 1000 cubic feet; and the quality had still been fairly maintained. If, as the Committee hoped, the consumption continued to increase, and two or three more mills were set to work in the town, they would have a corresponding profit, or a reduction in the price.

Alderman Firth seconded the motion.

Mr. Buckley said there was one point he wished to make a remark upon. He happened to be a member of the authority when they went to Parliament for powers to increase the charges for water. That increase fell mostly upon cottage property owners, to the relief of large consumers of water; and the property owners would have carried their opposition to Parliament, but for an arrangement made that some consideration should be shown to them by the Gas Committee handing over about £1000 a year out of their profits from gas in reduction of the burdens on the rates. Some people now said, "Well, but that is not right." But how did it operate upon cottage property owners? If they had not gone to Parliament, and obtained increased powers to charge for water, one mill, for instance, would have been contributing £70 per year more than it did now to cover the loss. This being the case, he thought it was due to the cottage property owners that they should keep faith with them.

Mr. Chadwick said he could fully endorse the remarks of Mr. Buckley on this point. He had frequently mentioned it before, and had been struck with the arguments of some members, that the Council in the past had no right to bind the Council in the future. When a corporate body went to Parliament for powers, and entered into an arrangement, it was the duty of that body to keep faith with the ratepayers. He maintained that the principle was right. Last year they practically took nothing from the gas-works. This year they were to have £251 in aid of the rates. He thought if they had changed the

figures, and placed £500 to the relief of the rates, instead of to the reserve fund, it would have been better.

Mr. GREENHALGH advocated a reduction in the price of gas, and contended that the consumers ought to have it supplied as near cost price as possible.

The MAYOR said he quite fell in with the remarks of the Chairman of the Gas Committee. He thought it wise of any Committee to first see to their own business before beginning to transfer their property to another. When he considered that the neighbouring borough—Bury—was selling gas at 1s. 11d. per 1000 cubic feet, he thought they ought to aim at that price, or something like it, before they attempted to be liberal with any profits derived from the gas-works.

Mr. LAWTON, in reply to a question, said they had decided to alter the mode of purification. As to the gasholder, the Committee had had two schemes before them—one was to erect a new holder, and the other was to put an extra lift on the top of one of the present holders; and they had decided that, as the tank was already made, it would be better to put in the new holder.

The minutes were adopted.

MONTE VIDEO GAS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Friday, at the Cannon Street Hotel, E.C.—Mr. A. K. MACKINNON in the chair.

The SECRETARY (Mr. A. G. Hounsham) read the notice convening the meeting; and it was agreed to take as read the Directors' report and the accounts for the year ended Dec. 31 last, an epitome of which appeared in the JOURNAL last week (p. 1028).

The CHAIRMAN said that the report and accounts which the shareholders had received placed them in possession of the highly satisfactory fact that, in spite of a crisis that swept across Uruguay, in common with other South American States, the same dividend was recommended as was paid in the year previous. The accounts did not seem so satisfactory, but in reality they were. The present position of the Company was better than in any year since its formation. The same progressive increase in the consumption of gas had not been maintained, as they had hoped and believed would be the case, owing to the effect of the crisis causing a noted economy among the consumers; but, nevertheless, the increase in the consumption by private consumers, over and above that of the year 1889, was no less than £10,601, and the increase in new meter-rental, £394. This augured hopefully for the future increase, when more prosperous times arrived, of which they already saw indications. They were endeavouring, with some success, to extend the economic use of gas in stoves for cooking and for boiling water, gas being, at the price charged, fully half that paid for spirits of wine, which was usually highly diluted with water, and which was largely employed for that purpose, with its many attendant dangers. He believed that in these sources they might reasonably expect in the future a steadily increasing demand, to add to their general consumption. Returning to the accounts, he said the shareholders would observe that for the year 1889, £5000 was placed to the reserve fund, and £1500 to the insurance fund; and they would come to the conclusion from this that they were not in so good a position as they were then. He would disabuse their minds by giving them the following data which they could easily verify. In the balance-sheet made up to Dec. 31, 1887, there appeared as spent on capital account the sum of £220 for meters. At the latter end of that year, he (the Chairman) went to Monte Video at the Board's desire. He soon found that, if they were to hold their own, and look forward to a prosperous future, they would have to put their house in order; and in doing so they had inevitably to spend money. In 1888 they expended in the purchase of land, mains, and meters £6655; in 1889, on additional land, extensions of mains and services, new meters, payments on account of new gasholder, &c., the sum of £40,194; and in 1890, on buildings and machinery, new and additional mains, services and meters, balance for new gasholder, &c., £20,608—or a total amount of £67,458. If they deducted the new capital taken up by the shareholders of £58,080, from this amount, they obtained a balance of £9378, derived and extracted from the general revenues of the Company. These figures would convince them that the Board found a better and more productive field for their expenditure than adding to the reserve fund. They would reap the reward for this in the satisfaction of having shortly finished and in action a most complete, efficient, and model establishment, with a certain reward in the future, consequent on the Company being in a position to develop a large and increasing business for many years to come. In regard to this, he would say no more, as Mr. Morton would address the meeting, and give particulars as to the progress of the new works and other matters. Of course, in order to discharge certain liabilities for the above objects, the Directors sold the investments, amounting to £30,000, at a profit of £1532; and he was happy to say that they had replaced the £30,000 in equally safe and satisfactory securities. The shareholders would have noticed that the suspense account had been reduced from £33,096 in 1887 to £13,698. He hoped that as they realized the Government securities they held they might be able to eliminate this altogether, and place a substantial amount to their credit. He was glad to draw the attention of the shareholders to a decrease in the year in expenditure, as compared with the previous one, of £3708 for rent, taxes, and general charges. The Company's dock revenue showed an improvement in the same period of £947. Gratifying as this was, he could not say that they had yet reached the point they had a right to expect. It would be remembered that the idea of the late Viscount Mauá was to use the dock primarily for the discharge of the Company's coal ships. At that period small vessels were obtainable that could enter the dock direct to discharge. This class of vessel had almost entirely disappeared, and been replaced by much larger ones that could not get into the dock. The suggestion had been made to the Directors by a very competent authority that they should enlarge it to admit them, as also for the repairs of larger ships that at present were repaired in another dock in the bay. This was one of the problems that the Board had to study with the view of increasing their revenue in the future. It was unsatisfactory, as stated in the report, that the Company, in supplying only a few public lamps, had, at the wish of the authorities, to keep the mains fully charged with gas, thereby entailing upon them considerable loss. One could not, he said, but be amazed at the short-sightedness of the Municipality; for, as matters now stood, it ought to make them reflect on the seriousness of the position of having a town of the importance and wealth of Monte Video at the mercy of a feeble electric glow lamp light. Having referred to the present condition of the Republic of Uruguay, he said that, although the Company had a multitude of transactions there last year in paper money, it was not a little significant that they had only lost in exchange and conversion of notes £219, against which they had earned £182 in interest and discount. In conclusion, he moved that the report and accounts be approved and adopted.

Mr. ROBERT MORTON, in seconding the motion, said, as stated in the report, he visited Monte Video in July last, for the purpose of inaugurating a change of management, and to make himself conversant with the working of the concern out there. He saw Mr. Lane, their late Secretary, installed as General Manager; and he believed the Company's prospects in Monte Video, under his management, were better than they had ever been. He also appointed Mr. James Anderson as Resident Engineer, and made some important changes in the staff. This was not a very pleasant thing to do; but he found himself face to face with a state of things which necessitated it. The changes in the staff of the works and outdoor departments made a reduction in expenses of something like £130 a month; and the alterations in the office and fittings department, and the arrangement entered into with the new General Manager, led also to a considerable reduction—amounting altogether to something like £2700 a year. This, it should be mentioned, was not by curtailing in any way the efficiency of the departments. He believed the staff were now in a thoroughly sound condition, and very much better equipped for the work to be done than they were when he went out. This, of course, pointed to something having been amiss—amiss only, he was bound to say, in too large salaries having been paid, and too many men engaged to do the work necessary. He was also expected to say something in regard to the new works. As justifying the considerable expenditure which had been referred to by the Chairman, he might remark that the large increase which was reported last year as having taken place in the private consumption, notwithstanding the decrease in the consumption for public lamps, brought the old works really up to the limit of production. In July, 1889, the private consumption was 35·6 per cent. over the corresponding month of 1888; and this percentage was almost maintained during the whole of that year—being 33 per cent. in December, and in the intermediate months something like the same figure. Then, in 1890, there were increases of 28 and 21 per cent., and so on, up to the end of June. In July, it was 12 per cent.; in August, 15 per cent. Then it began to fall off. The increase in September was only 9 per cent.; and in October it was 8 per cent. This, however, it should be observed, was over an increase of about 30 per cent. in the year before. Then in November last a decrease occurred of 2½ per cent.; and in December, of 20 per cent.—bringing them back to a consumption of only 13 per cent. greater than in 1888. In January, February, and March of this year there were decreases of 13, 24, and 22 per cent. respectively; and they were glad to hear that in the month of April it was only 11 per cent., and that they had connected about a dozen new consumers. The Directors had expected the increase would have been continued; and hence additional capital outlay. He might say, however, that the whole of the works projected had not been carried out. When he found this state of things, they decided not to build the retort-house which had been planned, as they would have to make a large increase in the present consumption before they arrived at the limit of the existing retort-power. He found the mains were in a very bad condition. Many of them were only 2-inch; and in a number of cases they had been fractured, and, instead of new ones being laid, the ends had simply been tied up with canvas, white lead, and string. Wherever possible, they were going systematically over the mains, and remedying this state of things. Referring to the sea-wall which they had had to build, he said it had cost them a great deal more money than it ought to have done; but it had now been finished. The completion of this wall delayed for some little time the erection of the purifying-house, which rested, on two sides of it, on the sea-wall and the boundary wall. The purifiers had, however, now been put down; and new condensers, scrubbers, exhausters, engines and boilers, and a station meter were also nearly completed. The coal-stores which had been in course of erection during the last year or two had been finished as far as was necessary for the present; and it now remained to build two other coal-stores in a line with them. Before concluding, he alluded to the relations of the Company with the Government and its officials; and stated that at the present time they stood in better odour with them than they had ever done before. What they required out in Monte Video was a very energetic Manager; and he was convinced they had one in Mr. Lane.

Mr. LOWE, in the course of a long speech, said it must have been a matter of congratulation to every shareholder that Mr. Morton had been out to Monte Video, as his visit seemed to have done a great deal of good. Some of Mr. Morton's remarks, however, had rather filled him with dismay. He had almost confessed that there were further extensions of the works in view. They were over-capitalized already; and yet there was an inclination on the part of the Directors to spend more money. When the Company was commenced, they regularly had a dividend of 8 per cent.; but now they had to be thankful with a wretched one of 6½ per cent. He then criticized various items in the accounts—calling special attention to the largeness of the stock of coal and cannel, £14,582; gas-fittings, £11,516; and materials for use, £19,686. He thought that the revenue account should be set out in greater detail; and not be given in lump sums, as, for instance, "Cost of manufacture and expenses at Monte Video, £78,430." He also commented upon the fact that every year they had a large sum written off as "bad and doubtful debts;" and he inquired what was the price charged for public lighting.

The CHAIRMAN: $4; and there is a deduction of 6½ per cent. for punctual payment.

Mr. BARBER and Mr. COPP also addressed the meeting.

The CHAIRMAN, in reply, said with regard to Mr. Lowe's statement

that the Company had paid 8 per cent., it was perfectly true, but that was paid through Viscount Mauá, the vendor, who guaranteed 8 per cent. for two years. As soon as the two years had terminated, the Company had to stand on its own foundation; and the Directors found they had a great many difficulties to contend against that they formerly knew nothing about. There were two years in which they paid no dividend, simply because they could not get money from the Municipality. They had also experienced great trouble, owing to the short tenure of the occupants of private houses; and this accounted for a great deal of the loss which they were obliged to write off. As to coal, they were compelled to keep a good stock at Monte Video; and they were obliged to seize every favourable opportunity of getting coal over at a cheap rate. Other points which had been mentioned by shareholders were also satisfactorily dealt with by the Chairman.

Mr. MORTON, speaking with regard to the increase in the capital, said that surely Mr. Lowe must see, without having it pointed out specially, that if there was such a large increase in business going on—at the rate of 30 per cent.—the old plant would get too small; and therefore new plant must be erected. While admitting that the capital was very large, he said it was most unreasonable to say so much on the point, as the present Board were not responsible for it—the Chairman being the only member who was connected with the original Board.

Mr. MATTHEWS said there was no doubt the Company were very heavily capitalized; but he thought the shareholders might congratulate themselves and the Directors on the good which had resulted from Mr. Morton's visit to Monte Video.

The motion was then carried.

On the proposition of the CHAIRMAN, seconded by Mr. DODGSON, a dividend of 14s. per share, free of income-tax, was declared; making, with the interim payment of 12s. per share, of 6½ per cent. for the year.

The retiring Directors (Mr. Simpson Rostron and Mr. T. C. Tatham) and the Auditors (Messrs. Price, Waterhouse, and Co., and Mr. E. Cheshire) were re-elected.

A vote of thanks to Mr. Morton, the Chairman and Directors, and the general officials was unanimously passed, on the motion of Mr. LOWE, seconded by Mr. BARBER.

The proceedings then terminated.

THE LANCASHIRE GAS COAL TRADE.

From Our Own Correspondent.

There is no feature of any special importance to report with regard to the coal trade in the Lancashire district. The recent Whitsuntide stoppages of the pits, which in many cases have been more protracted than usual, have necessarily caused a temporary cessation of the output; and this resulted mostly in the clearing away of the small stocks that were held at the collieries, and has helped to strengthen the market for the moment—the best qualities of round coal especially being, as a rule, firm at late rates. There is, however, a falling off in the inquiry generally; and in all cases there is some giving way. In the best qualities of house-fire coal, sellers here and there have been willing to accept about 3d. per ton less than their quoted list rates; while in the lower qualities of round coal, the demand is only indifferent, and shows signs of falling off so far as requirements for iron making and steam purposes are concerned. The result is that the commoner descriptions of round coal are undoubtedly easing in price. For the best qualities of Wigan Arley, prices may be quoted about 12s. to 12s. 3d. per ton; second qualities, about 11s.; with Pemberton four feet ranging from 10s. to 10s. 6d., and common house coals, from 9s. to 9s. 6d.; while common round coals, for steam and forge purposes, are to be bought at from 7s. 9d. and 8s. up to 8s. 6d. per ton, according to quality. Another feature in the market is the increasing difficulty which is being experienced in disposing of the inferior descriptions of slack. To some extent this is due not only to the lessened activity in the coal and chemical trades, but to the fact that in the latter industry re-arrangements of plant are being introduced which are making it more economical on the part of manufacturers to use a better class of fuel than has hitherto been supplied for chemical works; and this seems likely to throw upon the market a very considerable quantity of inferior descriptions of slack. The better kinds of engine fuel still move off fairly well; but even these are plentiful, and prices are a trifle easier. Burgy does not average more than 7s. to 7s. 6d. per ton; and good qualities of slack, 6s. to 6s. 6d. per ton, while common slack can be bought readily at about 4s., and in many cases at even less than this figure, at the pit's mouth. The general tendency of the market, so far as the demand is concerned, is undoubtedly in the direction of prices having to come down; but, as I have pointed out in previous reports, the men will, no doubt, take such measures as they can to counteract anything which may tend towards a reduction in their rate of wages. A complete cessation of work during the summer months has been talked of, as a check to any accumulation of stocks at the pits; while the tenor of the President's remarks and the discussion at the Miners' Conference at Chester, are evidence that the miners are determined to not only not recognize any possible effects upon prices which may arise from decreasing demand, but to resist to the utmost any reduction of wages which would naturally follow upon a less active state of trade. All this points to the improbability of any very material concessions being obtained upon contracts for gas coals which have to come upon the market; and, so far, where concessions have been made, they have been comparatively small—not averaging more than 3d. to 6d. per ton upon the prices obtained last season. So far as I have been able to gather, the general bases of prices, up to the present, for good Arley screened gas coal at the pit's mouth, for contracts, may be taken to average about 10s. per ton, which is slightly below the price obtained last year for similar qualities of gas coal.

Exhibition of Gas Appliances at Hastings.—Under the auspices of the Hastings Gas Company, an interesting and extensive exhibition of gas appliances manufactured by Messrs. T. Fletcher and Co., of Warrington and London, was opened in the Public Hall, last Tuesday. The exhibition remained open until Friday evening; and lectures on cookery were given twice daily by Miss Gertrude Cole.

NOTES FROM SCOTLAND.

From our Edinburgh Correspondent.

EDINBURGH, *Saturday*.

A two-minute sitting of the Edinburgh and Leith Gas Commission was held on Monday, at which, however, the time occupied was quite sufficient for all that there was to do. This is the period of the year when the Commissioners have most upon their minds. They have terminated one year's working and have begun another. But the results of the past year are not yet fully ascertained; so the policy of the current year cannot be determined. Meantime, the officials are busy gathering the revenue, and sending it through the multiform channels in the book-keeping departments, all of which will ultimately converge in the balance-sheet of Mr. Gibb, the Treasurer. Until then the Commissioner would be a foolish man who unbosomed himself freely, either in public or in that privacy which frequently is as good as, and sometimes worse than, open publicity. A great deal depends upon the outcome of the past year's working. Consequently, it is the duty of the Commissioners not only to wait till the officials have crystallized the results for them, but to ponder well the situation disclosed by these results before announcing how they intend to follow them up. For some time their communings should be in Committee; and the public should not be disturbed, as we have seen it, by preliminary newspaper paragraphs, by means of which the individual Commissioner who inspired them wished to concuss his brethren into adopting his particular views. There is need for reticence, lest unauthorized or hasty pronouncements should lead to expectations on the part of the public which events may not be found to justify. It is to be hoped, therefore, that those members of the Commission who may be taken into confidence by the officials, will not betray that trust, as I am sorry to say they have done every year hitherto, by being needlessly rash in getting unvouched statements into print.

While saying this, however, I am not by any means seeking to justify undue secrecy. On the contrary, I have always been an advocate for the utmost publicity when the time arrives; and I hold that, when all is ready, the public should have everything fully and frankly explained to them. We, the outside public, do not want that only one or two men in the district should understand our gas supply business. We do not want dictators on the Commission, but, to put it no higher, fellow workers—they on the one hand manufacturing the gas and delivering it to us, and we, on the other hand, providing them with the means to do it. We want all to take an intelligent interest in the business which is ours, in order that, as we choose, we may make changes in the *personnel* of the Commission, and that, when we do, we may not be shocked, as we have been, by lamentable displays of ignorance on the part of new members. We look forward then to a full explanation in due course of the whole of the ups and downs of the Commission during the past year, as well as of the means by which the Commissioners propose to protect and further our interests in the valuable property of the gas undertaking. If I might venture to suggest, no harm could result from the publication of results as soon as arrived at; but results only, and not the application of the..., which would prevent garbled accounts appearing.

One result can already be given with a tolerable approach to accuracy. While it takes time to collect all the items of income and expenditure, and to balance them so as to show whether any particular departments are thriving or the reverse, the monthly returns which are furnished by the Engineers prove that not only is the business, so far as its amount is concerned, a flourishing one, but that it has taken a leap forward which exceeds anything ever experienced in the history of gas supply in this district. The figures are not quite the same as those which the Commissioners will have before them in their annual balance, in respect that the former are for the period from May 1, 1890, to April 30 of this year, inclusive, whereas theirs will be from May 16, 1890, to May 15 last, inclusive. They are, however, approximately the same. It is found, then, that the output from the Edinburgh works was 974,437,000 cubic feet, as compared with 814,736,000 cubic feet in the preceding twelve months—an increase of 159,701,000 cubic feet; while from the Leith works there was an output of 409,487,000 cubic feet, as compared with 424,491,000 cubic feet in the preceding year—a decrease of 15,004,000 cubic feet. The decrease in the output from the Leith works is accounted for by the districting arrangements which were made a year ago, but which have now been altered so as to more nearly proportionate the districts. Deducting the Leith decrease from the Edinburgh increase, there is left a net increase of 144,697,000 cubic feet. The total output from both works amounted to 1,383,924,000 cubic feet, as compared with 1,239,227,000 cubic feet in the preceding year. The quantity of gas sold in the year which closed at May 15, 1890, was 1,150,572,000 cubic feet; and if the unaccounted-for gas be calculated in the same proportion for the year just closed, the Commissioners should have sold more than 1270 million cubic feet, or 112 million cubic feet more than in the year ending at Whitsunday of 1890.

This enormous increase was attained in face of a rise of 3d. per 1000 cubic feet, imposed as from Whitsunday of last year; and a simple calculation shows that the extra revenue derived has been as follows: An addition of 3d. on the sale of the previous year, £14,382; and the full sum of 3s. 9d. on the increased sale, £21,000—total, £35,382. It must not, however, be assumed that because of this great increase of revenue there is bound to be a surplus. No reliable result can yet be ascertained as to revenue, because that for residuals must be taken into account. But on the expenditure side, it is known that coal alone would cost quite £45,000 more than in the previous year; while to that there is to be added about £8000 of increase in wages, and from £5000 to £7000 loss which was inflicted upon the Commissioners by the railway strike—making altogether about £60,000 of addition to the expenditure side of the balance-sheet. To go further than this would be to enter into regions altogether problematical; and although I have myself done so, I scarcely feel justified in submitting my conclusions to your readers, except to say that I stand prepared to learn, notwithstanding the enormously increased business, of a large deficit on the year's working, but for the greater part of which the Commissioners are in no way to blame.

Deficits seem to be the order of the day in gas undertakings in this

district. The Dundee Gas Commission, which started last year with a debit balance of £73 15s. 1d., have ended it with a deficit of £2381 4s. 4d. As in Edinburgh, this has been reached through a largely increased business; and there is thus reason for congratulation that though the balance is on the wrong side, it is no sign of a declining business. It is rather the reverse; and if sympathy is to be extended to the Gas Commissioners, it is because they were obliged to do a larger business than they estimated for, at a time when outward circumstances were unfavourable. The production of gas last year was 470,381,700 cubic feet; an increase of 48¼ million cubic feet over the output of the previous year. The sales for the past year amounted to 420,152,750 cubic feet; or an increase of 32,635,000 cubic feet. The only unsatisfactory feature of these results is that the unaccounted-for gas has risen from 30,100,000 to 44,789,900 cubic feet, or from 6·787 to 9·522 per cent. Possibly a greater amount of condensation in the mains, or other causes arising from the quality of coal used during the railway strike, will account for this. The most gratifying feature of the situation is that, contrary to the expectation of many, the Commissioners, by delaying entering into their contracts, have been able to secure coal at 17s. 2¼d., which is 10¼d. under the price paid last year; and consequently they are able to go on this year without raising the price of gas beyond 3s. 8d., at which it was fixed last year. This must be rather staggering to those in other places who went into the market two months ago, and had to pay an increased price for coal. The revenue last year was estimated at £80,460; and it amounted to £87,496. On the other hand, the expenditure was estimated at £80,266; but it mounted up to £89,877. Of the increase of £9611, no less than about £6000 was due to the extra coal required; and if the Commissioners have been able to meet the loss by the railway strike and increased charges for labour with £3600, they have got very well off indeed. This year, it is significant to note, the Commissioners expect to carbonize each ton of coal for £1 0s. 8d., as against £1 1s. 10¾d. last year, which may be taken as an indication that labour questions are not expected to give trouble in Dundee for some time. The estimates for the current year are for an output of 490,000,000 cubic feet of gas, at an expenditure of £90,879; and the revenue is estimated at £98,208, which would leave a balance of profit in May next of £329, after wiping out the present debit balance.

From our Glasgow Correspondent.

GLASGOW, *Saturday*.

The question of the Glasgow Corporation Gas Commissioners securing legal powers to supply gas in the parish of Old Kilpatrick has been up again this week. A special meeting of the Gas Corporation of Dumbarton was held on Tuesday evening, for the purpose of considering the letter sent by the Glasgow Town Clerk on the 22nd inst., in which a succinct historical account was given of the gas supply undertaking. The letter closed thus: "I need scarcely remind you, in conclusion, that at the meeting between your Gas Committee and the deputation from Glasgow, to which reference has already been made, it was distinctly indicated by several members of that Committee that the Dumbarton Corporation had no intention of extending their gas-mains into the district before mentioned, seeing that it had all along been sufficiently supplied by the Partick, Maryhill, and Hillhead Gas Company and their predecessors, and could no doubt continue to be supplied by the Corporation of Glasgow, as the successors of these parties, much more advantageously than it was likely to be by the Corporation of Dumbarton. The Dumbarton Corporation cannot fail to recognize the fact that, unless they themselves are prepared either to acquire the works of the Dalmuir, Kilpatrick, and Bowling Gas Company, and to undertake to supply gas within the district in question, or to consent to the Corporation of Glasgow obtaining such statutory authority as is necessary to enable them to do so, the district will, from and after July 1 next, be left without any supply of gas. This is a contingency which, it appears to the Glasgow Gas Committee, is not likely to be approved by any Parliamentary Committee. In these circumstances, the Corporation of Glasgow desire to place clearly before the Corporation of Dumbarton the issue now raised, in the hope that, on reconsideration of the whole facts, any misunderstanding or conflict of interests may be avoided. With that view I am directed to intimate that should your Committee still refuse to acquiesce in one or other of the alternatives above indicated, the Corporation of Glasgow can have no alternative but to bring the whole facts before the Committee of the House of Commons when the Bill comes up for consideration, and to ask that the Corporation of Glasgow should obtain the powers which they seek. I am directed, however, to express the earnest hope that the Corporation of Dumbarton may reconsider the whole matter in a friendly spirit, and with the due recognition of the circumstances in which the Corporation of Glasgow are placed, and that the result may be an acceptance of one or other of the proposals submitted by the latter."

The meeting was presided over by Bailie Walker, in the absence of Provost Babtie, who had previously indicated his willingness that the Gas Commissioners of Dumbarton should hand over the districts in question to the Glasgow Corporation, as there was not, in his opinion, any probability that Dumbarton gas would ever be taken into it. When the contents of the letter were put before the meeting for discussion, Mr. Wilson stated his unwillingness to concede anything to the Glasgow Corporation until he had a mandate from his constituents to do so. He moved—"That the Dumbarton Corporation, while perfectly willing to negotiate on the basis of any equitable arrangement, with the information before them at present, they see no cause to alter the finding of the last meeting." Mr. M'Farlane seconded the motion. Treasurer Garvie submitted an amendment, the effect of which was that they should agree to the recommendation come to unanimously by the Dumbarton Gas Committee, that they give up their limit of supplying gas in the parish of Old Kilpatrick east of a line drawn north and south through Douglass Castle, reserving the portion of the parish west of this line. He asked if they were prepared to supply that area, or, if not, to fight the Glasgow Corporation. Were they going to send a deputation to London to oppose the Glasgow Corporation Bill, or stand idly by and allow the Glasgow Corporation to get equal powers to their own? They would never be able to compete with a large Corporation like Glasgow; and he would be very much in favour of the Clydebank people taking action themselves. If the Clydebank people would purchase the gas-works at Old Kilpatrick from the Glasgow Corporation, and apply for Dumbarton's rights, he would certainly go in for that at once; but he was not prepared to fight the Glasgow Corporation. The amendment was seconded by Mr. M'Leod; and then the Chairman in a quiet way briefly supported the motion.

On the suggestion of the Chairman, Mr. M'Gilchrist, Gas Manager, who was present, was invited to give his opinion on the subject. That gentleman, after explaining that he was present in response to a circular from the Clerk, said the letter from the Town Clerk of Glasgow raised a false issue before the Gas Commissioners of Dumbarton. He had listened to the reading of the letter, and found that the Town Clerk simply wished to cover the illegal action of the Glasgow Gas Corporation in laying pipes in the parish of Old Kilpatrick. They asked Dumbarton to purchase the Dalmuir, Kilpatrick, and Bowling Gas-Works that could not supply one quarter of the district of the parish of Old Kilpatrick. The works were quite capable of supplying the present district; but that was a very small portion of the gas consumption of the parish of Old Kilpatrick, and more than that, they could not erect plant on the ground of the Dalmuir, Kilpatrick, and Bowling Gas-Works to manufacture one-third of the gas used in the parish. He thought it was simply a case of the Town Clerk of Glasgow wishing the Corporation of Dumbarton to assist them to get an Act of Parliament to legalize their illegal action in coming into the parish of Old Kilpatrick. If they wished to get quit of their works and pipes now, they should simply put them in the market, and perhaps the Clydebank people would buy them. If they could without parliamentary powers purchase them, surely they could without parliamentary powers sell them. It was no love for the Clydebank consumers that made them wish to get the Act of Parliament; because, as they had heard it stated, they wished to introduce a differential rate into the supply of these districts whenever they were successful in evicting the opposition Companies.

At the close of Mr. M'Gilchrist's statement, a division on the two propositions was taken; and the motion was carried by seven votes for the motion against two for the amendment. This decision was at once communicated to the Town Clerk of Glasgow; and the action for Glasgow to take has since been resolved on. As Lord Morley is to give consideration to the Glasgow and Partick Joint Bill on Monday, in his capacity of Chairman of Committees of the House of Lords, a deputation has been appointed to represent the Glasgow Gas Trust. It consists of ex-Bailie M'Laren (Convener of the Finance Sub-Committee), Bailie Paton, Sir James Marwick (Town Clerk), Mr. Bowers (his representative at meetings of the Gas Committee), and Mr. Foulis (the Corporation Gas Engineer). Most of these gentlemen left Glasgow for London this afternoon. How the dispute is to eventuate, no person at present knows. It has been suggested that Lord Morley may grant concurrent powers to Glasgow and Dumbarton in the district in question; and also that Glasgow has committed a mistake in not offering to Dumbarton a solatium to the extent of a hundred guineas or so, in the shape of compensation for the invasion of the territory which is covered by the Dumbarton Gas Act, but never occupied by the Corporation.

I am informed that the Glasgow Corporation Gas Committee held a meeting on Wednesday of this week, at which the tenders for coal were opened. Nearly a hundred tenders were submitted, some of which were for large quantities of cannel and splint coal. It is said that in a number of instances the price of cannel coal showed a rise ranging up to 3s. and even 3s. 6d. per ton. The tenders were remitted to the Committee on Contracts, and shortly some specific information of a reliable character may be vouchsafed to inquirers. The real facts of the case cannot long remain undisclosed. It is considered probable that the coal purchases about to be made will only have reference to part of the ensuing financial year, and that the remainder of the purchases will be made later on.

The repairing of the wrecked gasholders at the Dawsholm Gas-Works is proceeding rapidly, and already very considerable progress has been made. The £1000 reward offered for the discovery of the perpetrators of the supposed outrage still remains unclaimed. A well-known practical gas engineer tells me that the cost of the repairs will be considerably in excess of the amount estimated when they were resolved upon by the Gas Committee.

The present condition of the Glasgow pig-iron market is most abnormal; the fluctuations in the price of Scotch warrants having ranged this week between 52s. 1½d. and 58s. 10½d. per ton, the closing quotation yesterday being 58s. 6d. per ton cash.

Splint and main coals have hardened in value this week, the former being 3d. a ton dearer. Otherwise the situation is almost unchanged.

Northern Coal Trade.—There is now a distinctly easier tone in the coal trade of the North; and several kinds of coal are weaker in price. The demand from Belgium is less, though from Russia it is larger. Best Northumbrian steam coals are steady, at from 12s. 9d. to 13s. per ton, with a strong demand on most of the collieries. Second-class coals are much quieter; and the collieries have at times to make slight concessions in price to keep the pits fully at work. Small steam coals are also rather weaker. Gas coals vary much in price; about 9s. 6d. to 10s. per ton being the current rates, less discount for prompt cargoes. But one or two long contracts have been concluded at much lower prices—at as low, it is said, as equal to 8s. 3d. free on board in the Tyne. There is still a very large demand for gas coals for export. Bunker coals are very dull—as low as 8s. 9d., free on board, having been taken; while from that figure up to 12s. for best Durham screened has been asked. Manufacturing coals are also weaker. In coke, business is quiet; but the change in the iron trade may soon alter the appearance of matters. At present, the price for best blast-furnace coke is about 16s. 6d. per ton, free on board. There is no alteration in the price of gas coke; but the requirements are now nearer to the diminished production at this season. The falling off in the output is not locally so marked yet as it has been in other seasons when May is ended.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *May* 30.

Sulphate of Ammonia.—There is hardly anything to be reported beyond what was recorded last week; and although the business is small, the steady tone of the market is well maintained. Hull sales at £11, and Liverpool slightly in excess of this figure, continue to be made; and the quantities on the market are reaching a small compass, owing to the present reduced production. Shipments from this port are fairly large; and inquiries for summer delivery are on a good scale. So that even with a very dull nitrate market we may see sulphate values hold their own; while a more active demand would quickly bring enhanced prices. It is quite certain that, in the meantime, a number of buyers hold aloof, in the hope of a fall in prices.

LONDON, *May* 30.

Tar Products.—Very little new business is reported. Pitch, however, is firmer; and there is apparently a squeeze to get deliveries before the close of the shipping season. Benzols continue dull. There are buyers at 3s. 10d. for 90's; and at 2s. 10d. for 50's. Common tar oils are in better demand; and prices are slightly improved. Carbolic acid is slow of sale, and price continues low. Several important tar contracts have been let at a remarkable variation in price—namely, 22s. 6d. to 33s. This arises from the quality of the tar; as, owing to the new process in carbonizing for denuding the tar of the lighter products for illuminating, there is a difference in value between them beyond what is represented by the before-mentioned figures. Prices are: Pitch, 34s. Benzol, 90 per cent., 3s. 10d.; 50 per cent., 2s. 10d. Toluol and solvent naphtha, 1s. 6d. Crude naphtha, 1s. 1d. Creosote, 1¾d. Carbolic crystals, 5¾d.; crude, 60's, 1s. 5d. Cresol, 8d. Anthracene, 30 per cent., "A" quality, 1s. 3d.; "B" quality, 11d.

Sulphate of Ammonia.—There are more inquiries in the market; and although the price is not better, business is undoubtedly stronger. The better inquiry unfortunately comes too late to lead to any hope of much better prices this season. Sales have been noted at from £10 15s. to £11., according to position and terms of delivery. Gas liquor is quoted at from 5s. to 6s.

Malta and Mediterranean Gas Company, Limited.—The Directors of this Company report that the general result of the working during the year ending March 31 last has been satisfactory—there having been an increase both in the gas-rental and revenue from other sources. After providing for the dividends on the first and second preference capital, the Directors recommend that a dividend of 4 per cent. be declared on the ordinary capital; making, with the interim dividend paid in December last, a total dividend of 6 per cent. per annum—leaving the sum of £2667 to be carried forward. The Directors regret to announce the death of Mr. Alfred Hersee, an Auditor of the Company; and to fill the vacancy, they have elected Mr. T. Guyatt. The profit and loss account shows that the receipts for the twelve months amounted to £33,293; and deducting from this the expenditure, a balance remained to be carried to the general revenue account of £12,313.

Exhibition of Gas Appliances at Cambridge.—In conjunction with Messrs. T. Fletcher and Co., of Warrington and London, the Cambridge Gas Company held an exhibition of various kinds of gas appliances in the Corn Exchange, from Monday to Friday evening of last week. The exhibition was opened by the Chairman (Mr. C. Balls), who, in the course of his speech, pointed to the many advantages of gas-stoves both for cooking and heating. As to stoves for the latter purpose, he said he was sorry he had a daughter who had been an invalid for some months; and she had had one in her room, and it had been the greatest possible comfort. It did not affect her breathing; and there was no inconvenience attached to it. Most of the exhibits were supplied by Messrs. Fletcher and Co.; but a collection of lamps was shown by the Deimel Light Company, "Stott-Thorp" patent reflex lights and automatic governors by Messrs. James Stott and Co., and an "Otto" gas-engine by Messrs. Crossley Bros., Limited. Twice daily Miss Eddens, of the South Kensington School of Cookery, delivered lectures on cooking by means of gas-stoves; and on Thursday evening Mr. T. Fletcher lectured on "Flames."

Improvements at the High Wycombe Gas-Works.—The works of the High Wycombe Gas Company are being thoroughly remodelled and enlarged by Mr. C. King, the Engineer and Secretary, who, it may be remembered, was entrusted with their management, on the death of Mr. E. E. Phillips, about a year ago. Commencing with the retort-house, generator furnaces on Mr. Frith's pattern are being put in; and, in conjunction therewith, new hydraulic and foul mains and connections are being provided. The retorts will have self-sealing lids in place of lime luting. Formerly the hydraulic main was in one length, and the dip-pipes were sealed 4½ inches, with no valve to regulate the seal. In his new settings, Mr. King has put a separate hydraulic main and valve to each bed of retorts. The boiler and men's mess-room have been moved out of the retort-house, and a separate building provided for them. Passing into the yard, a new scrubber, 40 feet by 10 feet, is being erected; and the condenser is being shifted from its present position, and placed before the exhauster. The washer, too, is being moved; and henceforth it will stand before the scrubber. With regard to storeage, two small gasholders, of 7000 and 18,000 cubic feet capacity respectively, have been taken down and their tanks converted into tar and liquor wells. To compensate for this loss of storeage, a 60,000 cubic feet holder is being telescoped. The old station meter, capable of passing 2000 cubic feet of gas per hour, has been abolished, and one of six times its capacity substituted. Sulphate plant was erected towards the close of last year; and the works generally brought up to date. In the distribution department also improvements have been made. In some of the principal streets, 5-inch pipes have been put down for the 3-inch ones; and in due course some 2-inch pipes will be replaced by 6-inch. All these alterations are being carried out in accordance with plans and specifications prepared by Mr. King, who has been allowed a free hand in the matter. The Directors are endeavouring to increase their business; and they are placing their plant in a condition to deal with it when it comes.

Cookery Lectures at Croydon.—A very successful gas exhibition was held in the Public Hall, Croydon, during last week, by Messrs. T. Fletcher and Co. Miss Kelman lectured twice each day to crowded audiences; and on Friday afternoon she created great enthusiasm by cooking an entire dinner—consisting of soup, fish, roast, pudding, and pastry—in an hour and a quarter.

Messrs. C. and W. Walker supplied the Corporation of Glasgow last year with one of their patent ammonia purifying machines and tar extractor, guaranteed to purify 4 million cubic feet of gas per 24 hours. On a lengthened trial, the appliance was found to so much exceed the guarantee, that the Corporation have ordered another exactly similar. The firm are also supplying their patent purifying machines to Birmingham (for 3 millions per day), to the Crystal Palace District Gas Company, and to Bournemouth, Brussels, Alloa, Dunfermline, and other places.

Gas Exhibition at Bolton.—Last Tuesday, Mr. Alderman Miles, Chairman of the Gas Committee of the Bolton Corporation, opened an exhibition of gas cooking appliances in the Public Sale Rooms in that town. The principal exhibitors were Messrs. Unsworth and Richmond, Limited, who showed a good assortment of their stoves and ranges, as well as a remarkably cheap and useful griller. A conspicuous object in their collection was Braithwaite's "Thermodote," the patent rights in which have been acquired by the firm. It is a so-called instantaneous gas water-heater; but it is so arranged that the gas will only burn when the water is flowing through it. As soon as the water-tap is opened, the gas lights itself, and heats the water to a high temperature as it flows; and immediately on closing the tap the gas is extinguished. After a few remarks from Alderman Miles, Mr. Richmond explained the utility and convenience of gas-stoves; showing in what respect they conduce to domestic ease, health, comfort, and economy. He also directed special attention to the griller above referred to; remarking that it would supply a long-felt want amongst the labouring community. In connection with the exhibition, which remains open till Saturday, Miss Geddes, of the Yorkshire School of Cookery, gave practical illustrations of cooking by gas-stoves, each afternoon and evening.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 1062.)

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	10 Apl.	10½	Alliance & Dublin 10 p. c.	10	16–17	..	6 3 6
100,000	10	„	7½	Do. 7 p.c	10	11½–12½	..	6 0 0
300,000	100	2 Jan.	5	Australian (Sydney) 5 % Deb.	100	100–108	..	4 12 7
100,000	20	28 May	8	Bahia, Limited	20	14–15*	+1	10 13 4
200,000	5	13 May	7½	Bombay, Limited	5	6¾–7	..	5 7 1
40,000	5	„	7½	Do. New	4	4½–5¼	..	5 14 1
380,000	Stck.	26 Feb.	12½	Brentford Consolidated	100	217–222	..	5 10 4
125,000	„	„	9½	Do. New	100	158–163	..	5 13 6
220,000	20	12 Mar	11½	Brighton & Hove Original	20	40–42	..	5 9 6
320,000	20	10 Apl.	11½	British	20	44–46	..	4 17 10
50,000	10	12 Mar.	11	Bromley, Ordinary 10 p. c.	10	18–20	..	5 10 0
39,000	10	„	8	Do. 7 p. c.	10	13–15	..	5 6 8
328,750	10	13 Nov.	6	Buenos Ayres (New) Limited	10	9¼–10¼	..	5 14 3
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	100–103	..	5 16 7
150,000	20	26 Feb.	8	Cagliari, Limited	20	25–27	..	5 18 6
550,000	Stck.	10 Apl.	13¾	Commercial, Old Stock	100	260–265	..	5 3 9
130,000	„	„	10¾	Do. New do.	100	198–203	..	5 5 11
130,000	„	30 Dec.	4¾	Do. 4¾ p. c. Deb. do.	100	121–126	..	3 11 5
557,320	20	30 Dec.	13	Continental Union, Limited	20	48–50	–1	5 4 0
242,680	20	„	13	Do. New '69 & '72	14	—	..	—
200,000	20	„	10	Do. 7 p. c. Perf.	20	37–39	..	5 2 6
75,000	Stck.	25 Mar.	10	Crystal Palace District	100	193–205	..	4 17 7
486,090	10	28 Jan.	4½	European, Limited	10	20–21	..	—
354,060	10	„	4½	Do. Partly paid	7½	14½–15½	..	—
5,470,630	Stck.	12 Feb.	13	Gaslight & Coke, A, Ordinary	100	238–243	–1½	5 7 0
100,000	„	„	4	Do. B, 4 p. c. max.	100	97–100	..	5 0 0
665,000	„	„	10	Do. C, D, & E, 10 p.c. Pf.	100	255–260	..	3 16 11
30,000	„	„	5	Do. F, 5 p. c. Prf.	100	120–125	..	4 0 0
60,000	„	„	7½	Do. G, 7½ p. c. do.	100	175–180	..	4 3 4
1,300,000	„	„	7	Do. H, 7 p. c. max.	100	160–161	..	4 5 4
463,000	„	„	10	Do. J, 10 p. c. Prf.	100	253–258	..	3 17 6
476,000	„	„	—	Do. K, 6 p. c. Prf.	100	154–158	+1½	3 16 0
1,061,150	„	12 Dec.	4	Do. 4 p. c. Deb. Stk.	100	113–118	..	3 7 10
294,850	„	„	4½	Do. 4½ p. c. do.	100	122–126	..	3 11 5
908,000	„	„	6	Do. 6 p. c. do	100	165–170	..	3 10 6
3,800,000	Stck.	13 May.	12	Imperial Continental	100	223–228	–1	5 5 3
75,000	5	12 Dec.	6	Malta & Mediterranean, Ltd.	5	4¾–5¼	..	5 14 3
560,000	100	1 Apl.	5	Met. of Melbourne, 5 p. c. Deb.	100	110–112	..	4 9 3
541,920	20	27 Nov.	2½	Monte Video, Limited	20	19–20	..	5 10 0
150,000	5	28 May	10	Oriental, Limited	5	8¾–9¼*	..	5 8 1
60,000	5	25 Mar.	7	Ottoman, Limited	5	4–5	..	7 0 0
166,870	10	26 Feb.	2	Pará Limited	10	3–4	..	—
				People's Gas of Chicago—				
420,000	100	4 May;	6	1st Mtg. Bds.	100	92–97	..	6 3 9
500,000	100	1 Dec.	16	2nd Do.	100	93–98	..	6 2 5
150,000	10	28 Apl.	10	San Paulo, Limited	10	15¾–16¾	..	6 1 2
500,000	Stck.	26 Feb.	15½	South Metropolitan, A Stock	100	282–287	..	5 8 0
1,350,000	„	„	12	Do. B do.	100	235–240	..	5 0 0
166,500	„	„	13	Do. C do.	100	248–250	..	5 4 0
678,000	„	30 Dec.	5	Do. 5 p. c. Deb. Stk.	100	141–145	..	3 9 0
60,000	5	12 Mar.	11½	Tottenham & Edm'nton, Orig.	5	11–13	..	4 8 5
						*Ex div.		
				WATER COMPANIES.				
729,221	Stck.	30 Dec.	10	Chelsea, Ordinary	100	260–270	..	3 14 1
1,720,560	Stck.	10 Apl.	8	East London, Ordinary	100	212–217	..	3 13 9
544,440	„	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	140–145	..	3 2 0
700,000	50	12 Dec.	9	Grand Junction	50	115–120	..	3 15 6
708,000	Stck.	12 Feb.	10½	Kent	100	265–270	..	3 17 10
1,043,800	100	30 Dec.	9½	Lambeth, 10 p. c. max.	100	240–244	..	3 17 11
406,200	100	„	7½	Do. 7½ p. c. max.	100	197–202	..	3 14 3
260,000	Stck.	25 Mar.	4	Do. 4 p. c. Deb. Stk.	100	118–123	..	3 5 0
500,000	100	12 Feb.	12½	New River, New Shares	100	345–353	..	3 8 4
1,000,000	Stck.	28 Jan.	4	Do. 4 p. c. Deb. Stk	100	125–128	..	3 2 6
902,300	Stck.	12 Dec.	7	S'thwk & V'xhall, 10 p. c. max.	100	170–175	..	4 0 0
126,500	100	„	7	Do. 7½ p. c. do.	100	165–170	..	4 2 4
1,155,066	Stck	12 Dec.	10	West Middlesex	100	255–265	..	3 15 6

† Interim dividend.

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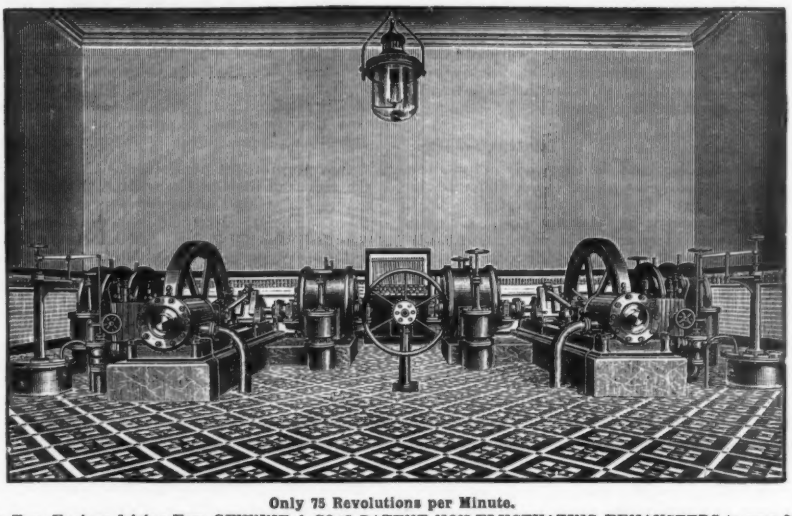

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SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

MR. ALFRED KITT, Consulting Engineer, 5, VICTORIA STREET, WESTMINSTER, late Engineer of the Pimlico and Westminster Stations of The Gaslight and Coke Company.

OXIDE OF IRON. Genuine Natural Bog ORE. QUALITY AND CONDITION GUARANTEED. Any quantity supplied at lowest rates.
D. M. NELSON AND SONS, GLASGOW. Telegraphic Address: "Gas Glasgow." Depôts throughout England and Scotland.

SADLER AND CO., LIMITED, MIDDLESBROUGH; ULVERSTON (BARROW); PORTSMOUTH; CARLTON; STOCKTON; 70, Wellington Street, GLASGOW; 58, Fountain Street, MANCHESTER; and 96, Reade Street, NEW YORK. Tar Distillers, Manufacturers of all TAR PRODUCTS, ALIZARINE and other TAR COLOURS, BICHROMES, OXALIC ACID, ALKALIES, LIQUOR AMMONIA, AMMONIA SULPHATE, &c.
Head Office: MIDDLESBROUGH. Correspondence invited.

BOROUGH OF MACCLESFIELD.

WANTED A MANAGER AND ENGINEER FOR THE GAS-WORKS.
SALARY £200 PER ANNUM.

THE Person appointed will be required to devote the whole of his time to the duties; and, in addition to taking charge of the Manufacturing Department, will have the Superintendence of the Laying of Mains, the Services, the Public Lamps, and the entire Distribution of Gas.
Applications, with not more than three recent testimonials, to be sent to me not later than June 27 endorsed "Gas Manager."
Dated this 27th day of May, 1891.
(Signed) W. FREDK. TAYLOR, Town Clerk.
Exchange Chambers, Macclesfield.

WANTED, a small Second-hand Beale EXHAUSTER.
State full particulars to J. HARDMAN & Co., Tunstall STOKE-ON-TRENT.

SECOND-HAND CONDENSER.

WANTED, by the High Wycombe Gas Company, a 10-inch ANNULAR CONDENSER, with Bye-Pass and Inlet and Outlet Valves, in good condition.
C. KING, Engineer.

WANTED, a Cast-Iron Tank, in good order, to hold about 100,000 gallons.
Quote lowest price f.o.r., or f.o.b., with sketch of Tank, and approximate time of delivery, to No. 1956, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CLEVEDON GAS COMPANY.

TWO Second-hand Purifiers wanted, 15 to 20 feet square, with Valves and Lifting Gear.
Address S. DAWES, Gas-Works, Clevedon, SOMERSET.

SUITABLE for Sulphate Manufacture. A CORNISH BOILER by Horton and Son, 18 ft. by 6 ft., Two Tubes, Safety Valves, &c., complete.
Apply to the MANAGER, Ware Park Mill, Ware, HERTS.

FOR SALE—A Single-Lift Gasholder, 50 ft. by 16 ft., with strong Guide-Framing, in good condition. Now being removed for extensions. A bargain to immediate purchaser.
Apply to R. & J. DEMPSTER, Gas Plant Works, Newton Heath, MANCHESTER.

FOR SALE—A Station Meter, with square case, and 12-inch Valves and Connections. Capacity, 20,000 cubic feet per hour. In good working condition.
May be seen, and full particulars obtained, on application to Mr. B. GREEN, Secretary and Manager, Gas-Works, Mitcham, SURREY.

TO BE SOLD, a Bargain—A Box and Waller's WASHER-SCRUBBER, 10-inch Connections. Removed through being too small. Can be seen at work.
Address the MANAGER, Gas-Works, LUTON.

TAR AND AMMONIA WATER.

THE Directors of the Kidsgrove Gaslight Company invite TENDERS for surplus TAR and WATER, together and separately, for Twelve months, ending June 30, 1892.
Quantity, about 880 tons altogether.
Tenders to be sent in not later than June 16.
THOMAS WARDLE, Secretary.
May 29, 1891.

CORPORATION OF SOUTHPORT.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the surplus TAR produced at the Gas-Works during the year ending June 30, 1892.
Specification and form of tender to be obtained on application to the undersigned, to whom tenders, endorsed "Tar," are to be sent not later than Monday, June 22 next.
The Committee do not bind themselves to accept the highest or any tender.
JOHN BOOTH,
Engineer and Manager.
Gas-Works, Southport,
May 30, 1891.

RAMSGATE CORPORATION.
(GAS AND WATER DEPARTMENT.)

THE Gas and Water Committee invite TENDERS for the supply of about 100 tons of best BRIMSTONE ACID (what is known as 80 per cent. Acid, with a specific gravity of 142°), to be delivered in equal monthly quantities between the 1st of July next, and the 1st of July, 1892.
Tenders to be sent in, addressed to the Chairman of the Gas and Water Committee, on or before noon on Monday, June 15, endorsed "Tender for Sulphuric Acid."
The Committee do not bind themselves to accept the lowest or any tender.
Full particulars on application to
WILLIAM A. VALON,
Engineer.

RAMSGATE CORPORATION.
(GAS AND WATER DEPARTMENT.)

THE Gas and Water Committee invite TENDERS for the supply and erection of two 25 feet square PURIFIERS and LIFTING APPARATUS complete; also for the supply of WROUGHT-IRON GIRDERS, TIE-BARS, HYDRAULIC MAIN, CAST-IRON FLOOR PLATES, ASCENSION-PIPES, DIPS, and other CAST and WROUGHT-IRON FITTINGS for Retort-House; also for the supply and erection of a WROUGHT-IRON ROOF for Retort-House, and COLUMNS, &c., for Purifier-House.
Tenders to be sent in on or before noon on Monday, June 15, addressed to the Chairman of the Gas and Water Committee, endorsed according to the Specifications.
The Committee do not bind themselves to accept the lowest or any tender.
Specifications and full particulars on application to
WILLIAM A. VALON,
Engineer.

TENDERS FOR COAL.

THE Dukinfield Local Board invite TENDERS for CANNEL and COAL, by Monday noon, the 29th of June.
Specification and forms of tender on application to
HARRISON VEEVERS,
Engineer.
Dukinfield, May 29, 1891.

TENDERS FOR TAR.

THE Dukinfield Local Board invite TENDERS for the TAR produced at the Gas-Works during the ensuing Twelve months, and amounting to about 650 tons.
Tenders by Monday noon, the 29th of June.
HARRISON VEEVERS,
Engineer.
Dukinfield, May 29, 1891.

THE Corporation of Middleton are pre- pared to receive TENDERS for the purchase of the TAR, for One, Two, or Three years, made at their Gas-Works, Middleton.
Sealed tenders, addressed to the Chairman of the Gas Committee, to be delivered at my Office on or before Wednesday, the 17th of June, 1891, endorsed "Tender for Tar."
Further particulars may be obtained on application to the Gas Manager, Gas-Works, Middleton
The Corporation do not bind themselves to accept the highest or any tender.
FREDERICK ENTWISTLE,
Town Clerk.
Town Hall, Middleton, near Manchester,
May 29, 1891.

CORPORATION OF LANCASTER.
(GAS DEPARTMENT.)

TENDERS FOR GAS COAL.

THE Gas Committee are prepared to receive TENDERS for the supply of about 12,000 tons of GAS COAL per annum, delivered on the Gas-Works Siding, Lancaster, in such quantities and at such times as may be required during a period of One, Two, or Three years, commencing delivery Aug. 1 next.
Sealed tenders, endorsed "Gas Coal," giving full particulars of the Coal offered, must be sent to Thom. Swainson, Esq., Town Clerk, Lancaster, on or before the 15th day of June next.
Forms of tender may be obtained on application to the undersigned.
The lowest or any tender not necessarily accepted.
C. ARMITAGE.
Gas-Works, Lancaster,
May 26, 1891.

SHREWSBURY GASLIGHT COMPANY.

TENDERS FOR COAL.

THE Directors of the Shrewsbury Gas- light Company invite TENDERS for the supply of about 13,000 tons of High-Class Screened GAS COALS, and about 650 tons of good ENGLISH CANNEL, to be delivered free at the Great Western or London and North-Western Goods Yard, Shrewsbury during the year commencing July 1, 1891, and ending June 30, 1892.
The Directors reserve to themselves the right to divide the quantity into two or more Contracts, and do not bind themselves to accept the lowest or any tender.
Tenders must be made on forms (containing further particulars) which may be obtained on application at the Company's Works, or by post, and must be sent to the undersigned, on or before the 20th day of June, 1891.
By order,
WM. BELTON, Assoc. M. Inst. C.E.,
Secretary and Manager.
Gas-Works, Shrewsbury,
May 19, 1891.

SHREWSBURY GASLIGHT COMPANY.

DISPOSAL OF SURPLUS TAR.

THE Directors of the above Company are desirous of receiving TENDERS for the purchase of the surplus TAR made at their Works during the year commencing July 1, 1891.
The estimated quantity for disposal is about 900 tons per annum.
Tenders must be made on forms (containing further particulars) which may be obtained on application at the Company's Works, or by post, and must be sent in to the undersigned not later than the 20th day of June, 1891.
The Directors do not bind themselves to accept the highest or any tender.
By order,
WM. BELTON, Assoc. M. Inst. C.E.,
Secretary and Manager.
Gas-Works, Shrewsbury,
May 19, 1891.

COUNTY BOROUGH OF BRADFORD.

TO COLLIERY PROPRIETORS.

THE Gas and Electricity Supply Com- mittee of the Bradford Corporation are prepared to receive TENDERS for the supply of best GAS COAL, COBBLES, NUTS, and CANNEL, all to be well-screened, dressed, and free from Shale and Pyrites, to be delivered at the several Works of the Corporation in the Borough, during the period of One year, commencing on the 1st day of August next, in such quantities weekly as may be agreed upon.
Form of tender, with any further information required, may be had on application to Mr. Wood, Gas Engineer, Town Hall.
Sealed tenders, endorsed "Tender for Coal," to be delivered to me on or before Monday, the 15th of June next.
The Committee do not bind themselves to accept the lowest or any tender.
By order,
W. T. MCGOWEN, Town Clerk.
Town Hall, Bradford,
May 25, 1891.

MANCHESTER CORPORATION GAS-WORKS.

SPENT OXIDE.

THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the Purchase and Removal of the SPENT OXIDE to be produced at their Gaythorn, Rochdale Road, and Bradford Road Works during a period of One, Two, or Three years from the 30th of June next.
The Committee do not bind themselves to accept the highest or any tender.
Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Spent Oxide," must be delivered at the Offices of the Gas Department, Town Hall, on or before Thursday, the 18th day of June next.
Forms of tender and further particulars may be obtained on application in writing to Mr. Charles Nickson, Superintendent of the Gas Department.
By order of the Gas Committee,
WM. HENRY TALBOT,
Town Clerk.
Town Hall, May 15, 1891.

LINCOLNSHIRE COUNTY LUNATIC ASYLUM, BRACEBRIDGE, NEAR LINCOLN.

GAS PLANT FOR SALE.

THE Visiting Committee of the Lincoln- shire County Lunatic Asylum are prepared to receive TENDERS for the under-mentioned PLANT, now standing at their Gas-Works, Bracebridge, and which may be inspected on application, viz.:—
GASHOLDERS—Two single lift, 30 ft. by 12 ft., and 20 ft. by 12 ft. respectively, with Inlet and Outlet Valves.
PURIFIERS—Set of four, with 6-inch Four-way Valves and Connections and Lifting Gear complete.
CONDENSER (annular), 6-inch Connections, 2 feet outer barrel, 10 feet high.
GOVERNOR—One 4-inch Stott.
Also a number of MOUTHPIECES, ASCENSION-PIPES, &c.
Tenders, to be endorsed "Tender for Gas Plant," and directed to the Chairman, Building and Sanitary Committee, Lincolnshire County Asylum, Bracebridge, must be delivered there not later than Ten a.m., on June 17, 1891.
By order,
ROBERT TOYNBEE,
Clerk to the Visitors.
Lincoln, May 26, 1891.

ETON GAS COMPANY.

SUPPLY OF GAS COALS.

THE Directors of the Eton Gas Company invite TENDERS for the supply of about 1500 tons of GAS COAL (Colliery weight), to be delivered free at the Windsor Station of the South-Western Railway, such Coals to be either of the following descriptions—viz., New Pelton, Pelaw Main, Ravensworth, Pelaw, Holmside, Aidwarke Main, or any other good Gas Coal (naming it).
The Coals to be delivered as follows—viz., in July, 1891, 50 tons; August, 50 tons; September, 100 tons; October, 100 tons; November, 200 tons; December, 200 tons; January, 1892, 150 tons; February, 200 tons; March, 150 tons; April, 100 tons; May, 100 tons; June, 100 tons—The Company having the option of increasing the quantity by 20 tons in any of the months at the contract price per ton for any extra quantity so required.
The Contractor to state for what description of Gas Coal he tenders.
The Directors will not entertain any conditional tender, or be bound to accept the lowest or any tender.
Tenders to be delivered on or before Monday, the 29th day of June, 1891, addressed to the Chairman, Gas Office, 10, High Street, Eton, Bucks.
By order,
J. NEEDHAM,
Secretary.
Gas Office, 10, High Street, Eton,
May, 1891.

Will be published to-morrow, Price 6s., bound in Cloth.

THE CHEMISTRY OF ILLUMINATING GAS.

By NORTON H. HUMPHRYS, M. Inst. C.E., F.C.S.

The matter composing this book consists mainly of articles written for, and published in, the JOURNAL. The preface says: "In view of new processes that seem to fall in thick and fast one on the other, it has been several times suggested that they should be collected together, so as to form a record of the various gas-making processes that have been proposed in the past, together with some account of the natural laws that govern the manufacture and supply of Illuminating Gas."

The work contains chapters on: The Relative Cost of Light from Gas, Oil, and Candles; Products of Combustion; The Sulphur Question; The Composition of Illuminating Gas; Water Gas; Various Gas-Making Processes; Oil Gas; Properties of Fluid Hydrocarbons; Tar for Gas-Making; Destructive Distillation; Condensation; and Purification.

LONDON: WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

TENDERS FOR COALS.

THE Isle of Thanet Gas Company invite TENDERS, to be delivered on or before Thursday, June 18, 1891, for the supply of 12,000 tons of the best Seaborne GAS COAL.

The Directors do not bind themselves to accept the lowest or any tender.

Particulars and times of delivery may be had on application to

THOS. C. FULLER,
Secretary.

Gas-Works, Margate,
May 30, 1891.

TENDERS FOR GAS COAL.

THE Atherton Local Board invite TENDERS for the supply of the GAS COAL and CANNEL required at their Works during One year from July 1, 1891.

The total quantity required is 3500 tons.

Further particulars may be obtained from the undersigned, to whom sealed and endorsed tenders may be delivered until Monday, June 8.

DANL. SCHOFIELD,
Clerk.

May 28, 1891.

EVESHAM CORPORATION.
(GAS DEPARTMENT.)

THE Gas Committee are prepared to receive TENDERS for the supply of 1000 to 1700 tons of screened GAS COAL, delivered free at Evesham Railway Station, during the Twelve months ending June 30, 1892, at such times and in such quantities as the Manager may direct.

Tenders, specifying the description of the Coal, to be sent to me on or before the 13th of June next.

THOS. COX,
Town Clerk.

Evesham, May 26, 1891.

COUNTY BOROUGH OF WIGAN.
(GAS DEPARTMENT.)

THE Committee will be pleased to receive TENDERS for one 18-inch STATION GOVERNOR, with Valves, Columns, Connections, &c., particulars of which may be obtained from the undersigned.

Tenders to Arthur Smith, Esq., Town Clerk, on or before the 15th prox.

The lowest or any tender not necessarily accepted.

JOS. TIMMINS,
Engineer.

Borough Gas-Works, Wigan,
May 26, 1891.

COUNTY BOROUGH OF WIGAN.

TO COLLIERY PROPRIETORS.

THE Gas Committee invite Tenders for the supply of COAL and CANNEL for One, Two, or Three years.

Particulars and form of tender can be obtained from the undersigned.

The lowest tender not necessarily accepted.

Tenders, sealed, and endorsed "Coal and Cannel," to be delivered to Arthur Smith, Esq., Town Clerk, on or before Monday, the 15th prox.

JOS. TIMMINS,
Engineer, &c.

Borough Gas-Works, Wigan,
May 22, 1891.

SLIGO GASLIGHT AND COKE COMPANY.

TENDERS FOR COAL.

THE Directors invite Tenders for the supply of 2000 tons of good screened GAS COAL, delivered f.o.b. at port of shipment.

Payment, net cash one month after delivery.

The Coal to be shipped in 200 or 300 ton lots as required during the Twelve months commencing Aug. 1, 1891.

The Directors do not bind themselves to accept the lowest or any tender.

Tenders, endorsed "Tender for Gas Coal," to be sent to the Chairman on or before June 22, 1891.

C. B. TULLEY,
Engineer and Secretary.

Gas-Works, Sligo,
May 16, 1891.

TENDERS FOR GAS COAL.

THE Directors of the Victoria New-market Gaslight and Coke Company, Limited, invite TENDERS for the supply of 4000 tons of best screened GAS COAL, during the ensuing Twelve months ending June 30, 1892.

Tenders, stating price per ton, delivered free at Newmarket Station as required, to be sent on or before June 18, 1891, to the undersigned, from whom any further particulars may be obtained.

The Directors do not bind themselves to accept the lowest or any tender.

By order,
J. H. TROUGHTON,
Manager and Secretary.

Gas-Works, Newmarket,
May 29, 1891.

YEOVIL GAS AND COKE COMPANY, LIMITED.

THE Directors of the above Company invite TENDERS for the supply of 1000, 2000, or 3000 tons of good GAS COAL, delivered free at the L. & S.W.R. at Yeovil, in such quantities as may be required by the Manager for One year, commencing on the 1st of July next.

Parties tendering to state price in Gas Company's and Colliery Wagon.

Tenders to be sent in not later than the morning of the 16th inst. when the same will be opened.

No tender necessarily accepted.

EDWD. HOWELL,
Manager.

Gas-Works Yeovil,
June 1, 1891.

LONGWOOD GAS COMPANY.

THE Directors of this Company are prepared to receive TENDERS for the surplus TAR and AMMONIACAL LIQUOR produced at the Company's Works, for One year from the 1st day of July next.

Liquor to be 5° strength at 60° Fahr., tested by a standard Twaddel's Hydrometer.

Tenders to be sent in, endorsed "Tender for Tar and Ammoniacal Liquor," not later than Saturday, June 13, 1891, addressed to the Chairman.

By order,
JOHN LOWE MITTON,
Manager and Secretary.

Gas-Works, Longwood,
May 30, 1891.

TAR AND AMMONIA WATER.

THE Directors of the Loughborough Gas Company are prepared to receive TENDERS for the surplus TAR and AMMONIA WATER to be produced at their Works for One year, from the 30th day of June, 1891.

The estimated quantity will be about 350 tons of Tar, and 900 tons of Ammonia Water.

The Tar and Liquor to be delivered into the Contractor's boats at the Wharf on the Derby Road, Loughborough.

The strength of the Liquor to be tested by Twaddell's Hydrometer (temperature 60°), and the tender to state the price per ton of 4° up to 8°.

The boats for the removal of the Tar and Ammonia Water to be sent at such times as may be required.

Payments on the 10th of the following month.

Further information may be obtained on application to the undersigned, to whom tenders, in accordance with this advertisement, must be sent not later than the 4th of June next.

The Directors do not bind themselves to accept the highest or any tender.

J. B. BALL, C.E.,
Manager.

Loughborough, May 21, 1891.

TO COAL MERCHANTS AND OTHERS.

THE Directors of the Sandown Gas and Coke Company, Limited, are prepared to receive TENDERS for the supply of best WALDRIDGE GAS COAL, or other approved Gas Coal, for One year from the 1st of August next.

The Coal to be delivered dry into the Company's Store, at the Gas-Works, Sandown, including all trimming necessary.

About 1300 or 1400 tons probably will be required during the year. The store will only hold about 250 tons.

Tenders to be sent in not later than Twelve o'clock at noon on Monday, the 15th of June next, endorsed "Tender for Coal."

Further particulars can be obtained from the undersigned.

The Company do not bind themselves to accept the lowest or any tender.

By order,
JAS. NEWMAN,
Secretary.

ALTRINCHAM GAS COMPANY.

COAL AND CANNEL CONTRACTS.

TENDERS are invited for best screened GAS COAL and CANNEL for One, Two, or Three years from the 1st of July next.

Estimated quantities required each year: Coal, 6000 tons; Cannel, 4500 tons.

Deliveries to be free at Altrincham Railway Station as required.

Sealed tenders, endorsed "Tender for Coal & Cannel," stating the description of both, the pits from which they are to be raised, the amount proposed to be supplied, and cash terms for monthly payments, to be sent addressed to the undersigned, so as to be received not later than Twelve o'clock noon on Tuesday, the 9th of June next.

The Directors do not bind themselves to accept the lowest or any tender; but the person or persons whose tender may be accepted will be required to execute an agreement for the due performance thereof.

No special form of tender is supplied.

F. R. B. LINDSELL,
Secretary.

Gas Offices, Moss Lane,
Altrincham, May 28, 1891.

MERTHYR TYDFIL GAS COMPANY.

TENDERS FOR COAL.

TO COLLIERY PROPRIETORS.

THE Directors of the Merthyr Tydfil Gas Company require TENDERS for the supply over One year of about 5000 tons (or such other quantity as may be agreed upon) of the best quality large well-screened GAS COAL, to be delivered on their Railway Siding (Taff Vale Railway), Gas-Works, Picton Street, Merthyr Tydfil, in such quantities as the Manager may from time to time require during a period commencing on the 1st of July next.

Payments will be made by net cash monthly for previous month's deliveries.

Further particulars, with specification and form of tender, may be obtained on application to the undersigned.

Tenders must be on the Company's printed form, otherwise they will not be considered; and the tender, sealed, and endorsed "Coal," specifying the description of coal, and the pit at which it is to be raised, must be addressed to T. J. Evans, Esq., J.P., the Chairman of the Directors, and delivered at the Gas Offices, Merthyr Tydfil, not later than Ten o'clock a.m. on Tuesday, the 9th of June proximo.

The Directors do not bind themselves to accept the lowest or any tender.

By order of the Board of Directors.

JOHN L. COCKER,
Secretary and Manager.

Gas Offices, Gas-Works,
Merthyr Tydfil, Glamorganshire,
May 18, 1891.

TENDERS FOR GAS COAL.

THE Directors of the Exmouth Gas Company invite TENDERS for the supply of about 1900 tons of screened or unscreened ARLEY, HOLMSIDE, or NEW PELTON COAL, or best NEWCASTLE or other good GAS COAL.

Tenders to be for price f.o.b.; also price delivered free at Exmouth Docks, between the 1st of July next, and the 30th of June, 1892, accompanied by working analysis.

Sealed tenders, addressed to the Chairman, and endorsed "Tender for Coal," to be sent in not later than the 15th day of June next.

No tender necessarily accepted.

By order,
JAMES T. FOSTER,
Secretary.

Exmouth,
May 14, 1891.

COUNTY BOROUGH OF ST. HELENS.
(GAS DEPARTMENT.)

GAS COALS.

THE Gas Committee of the St. Helens Corporation invite TENDERS for the supply of COAL and CANNEL for gas-making purposes at their Works, for One or Two years, commencing the 1st of July, 1891.

Forms of tender and all particulars may be obtained on application to the undersigned.

The tenders, endorsed "Gas Coals," are to be delivered on or before Tuesday, the 9th of June next, addressed to the Chairman of the Gas Committee, Warrington Old Road, St. Helens.

The Committee reserve to themselves the right to decline the lowest or any tender.

SAMUEL GLOVER,
Engineer and Manager.

Gas-Works, St. Helens,
May 23, 1891.

LEIGH LOCAL BOARD.

THE Gas Committee of the Leigh Local Board invite TENDERS for the supply of GAS COAL or NUTS, for a period of One year, commencing on the 1st of July next.

The quantity required is 7000 tons.

Specification and all particulars may be had from the undersigned.

Sealed tenders, endorsed "Coal," and addressed to Mr. Alderman Thorp, Chairman, to be delivered at the Town Hall, Leigh, not later than Monday, the 15th of June next.

The lowest or any tender not necessarily accepted.

ALFRED T. FLETCHER.
Engineer and Manager.

Gas-Works, Leigh, Lancs.,
May 23, 1891.

COUNTY BOROUGH OF STOCKPORT.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of CANNEL and COAL, averaging about 43,000 tons per annum, for One, Two, or Three years, commencing on the 1st of July next ensuing.

The Cannel and Coal offered must be screened, free from Bats, Bind, Refuse, or Dirt.

Forms of tender and full particulars as to quantities, mode of delivery, &c., can be obtained on application to the Engineer, Mr. S. Meunier, Millgate Gas-Works.

Tenders, stating price per ton, delivered in the Portwood Drops or Railway Station, Stockport, endorsed "Cannel, Coal, &c.," must be sent in, addressed to the Chairman of the Gas Committee, on or before the 11th day of June next.

No form of tender but that issued by the Committee will be considered.

The Committee do not bind themselves to accept the lowest or any tender.

WALTER HYDE,
Town Clerk.

Stockport, May 19, 1891.

TENDERS FOR COAL.

COMMERCIAL GAS COMPANY.

THE Directors are prepared to receive TENDERS for the supply of 140,000 tons of clean, dry, unscreened, fresh-wrought GAS COALS, delivered f.o.b. to the Company's Steamers at any suitable port, during the year ending the 31st of July, 1892.

The deliveries to be in equal monthly quantities throughout the year.

Payment in Cash fortnightly.

Particulars and forms of contract may be obtained from the Engineer, Mr. H. E. Jones.

The Directors do not bind themselves to accept the lowest or any tender.

Tenders, sealed, and endorsed "Tender for Coals," to be addressed to the Chairman of the Coal Committee, and delivered to the Company's Offices not later than the 11th of June next.

Commercial Gas-Works, Stepney, E.,
May 30, 1891.

SEVENOAKS GAS COMPANY.

TO COLLIERY PROPRIETORS AND AGENTS.

THE Directors of the Sevenoaks Gas Company are desirous of receiving TENDERS for the supply of 5000 tons of GAS COAL, to be delivered during Nine months from June, 1891, to March, 1892, at the Bat and Ball Station, L.C. & D. Railway, Sevenoaks.

The Districts preferred are those of Durham, Newcastle, and Yorkshire; and two-thirds of the quantity will have to be delivered by Dec. 31, 1891, and the remainder by the beginning of March, 1892.

The Directors reserve to themselves the right of dividing the contract among two or more firms, and are not bound to accept the lowest or any tender.

Forms of tender may be obtained on application to the undersigned; and the tenders themselves must reach the Company's Office not later than Wednesday, the 10th of June next, endorsed "Tender for Gas Coal," and addressed to the Chairman, William Hughes, Esq., 88, High Street, Sevenoaks.

By order,
HENRY HOW, Secretary.

Gas Office, Sevenoaks,
May 23, 1891.

THE Hindley Local Board are prepared to receive TENDERS for the purchase of the TAR and AMMONIACAL LIQUOR produced at their Gas-Works during the ensuing Twelve Months.

Full particulars, with form of tender, can be obtained on application to Mr. Wm. Dickinson, Gas and Water Manager.

Sealed tenders, endorsed "Tender for Tar, &c.," to be lodged with the undersigned not later than Monday, June 15, 1891.

By order,
STEPHEN HOLT,
Clerk to the Local Board.

Offices: Cross Street, Hindley,
May 22, 1891.

TENDERS FOR GAS COAL.

THE Directors of the Cheltenham Gas-light and Coke Company are prepared to receive TENDERS for a supply of COAL, to be delivered between the 1st of August, 1891, and the 31st of July, 1892.

Particulars may be obtained from the undersigned, to whom tenders, endorsed "Tender for Coal," must be delivered on or before Tuesday, the 16th of June next.

The Directors do not bind themselves to accept the lowest or any tender.

R. O. PATERSON,
Engineer.

Gas-Works, Cheltenham,
May 22, 1891.

BOROUGH OF MACCLESFIELD.

THE Gas Committee are prepared to receive TENDERS for the supply of the whole or part of 10,000 tons of the best screened GAS COALS and 2000 tons of CANNEL, delivered free at Macclesfield, to commence on the 1st day of July, 1891, extending One year, and in such quantities as may be ordered.

Tenders, sealed and endorsed, to be sent in not later than Saturday, the 6th day of June, 1891, addressed to the Chairman, Gas Committee, Town Hall, Macclesfield.

The Committee do not pledge themselves to accept the lowest or any tender.

(Signed) W. FREDK. TAYLOR,
Town Clerk.

May 25, 1891.

TO RETORT SETTERS AND GAS PLANT MAKERS.

THE Gas Committee of the Cockermouth Local Board invite TENDERS for the BUILDING of a RETORT STACK to contain twenty-four Retorts.

Also TENDERS for the supply and delivery of HYDRAULIC MAIN, and other IRONWORK for above.

Plans and specifications may be seen at the Gas-Works; and further information obtained from the undersigned.

Tenders, endorsed "Retort-Setting" or "Ironwork," to be sent in not later than Thursday, the 4th of June next.

ER. W. SMITH,
Gas Manager.

May, 1891.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

THE Directors of the above Company are prepared to receive TENDERS for a supply of Best Screened NEWCASTLE, LANCASHIRE, and DERBYSHIRE GAS COALS, to commence next October, for a period of One, Two, or Three Years—the annual quantity being about 100,000 tons—to be delivered monthly in accordance with a specification to be had on application to the Company.

About 90,000 tons are to be delivered annually alongside the Company's Stores, Sir John Rogerson's Quay, Dublin, and 10,000 tons on the Wharf, Dunleary Harbour, Kingstown, Co. Dublin.

Parties tendering can do so for the whole quantity or for quantities from 20,000 tons and upwards.

The Coals must be fresh, of the best quality, properly cleaned, free from dust, stones, pyrites, and all other impurities.

Tenders must state the name and locality of the pit or pits and the particular seam from which it is proposed to supply the Coals.

Tenders to quote price f.o.b. and *ex* ship Dublin and Kingstown, including cost, freight, and insurance.

The Contractors will be bound to supply the coal strictly in accordance with an analysis, which must accompany each tender.

Specifications for monthly deliveries, conditions of discharging, and all other information can be had on application to the Company's Offices.

The Directors do not bind themselves to accept the lowest or any tender.

Sealed tenders, directed to the Secretary, are to be lodged in the Company's Offices, D'Olier Street, on or before the 9th of June, endorsed "Tender for Coal."

W. F. COTTON,
Secretary and Manager.

Gas Offices, D'Olier Street,
May 18, 1891.

MALTA AND MEDITERRANEAN GAS COMPANY, LIMITED.

TO THE SHAREHOLDERS.

NOTICE is hereby given, that the ORDINARY GENERAL MEETING of the Shareholders of this Company will be held at the Offices, 60, Gracechurch Street, London, E.C. on Tuesday, the 23rd of June, 1891, at Twelve o'clock at Noon, for the purpose of receiving the Report of the Directors and the Accounts for the Year ended the 31st of March, 1891, and for the transaction of the general business of the Company.

One of the Directors, John Orwell Phillips, Esq., will retire from office, but offers himself for re-election.

The Auditors, Robert Hesketh Jones and Thomas Guyatt, Esqrs., will retire from Office, but are eligible for re-election.

The Transfer Books will be closed from the 9th of June until the day of the meeting, both inclusive.

By order,
A. W. COOPER,
Secretary.

60, Gracechurch Street, E.C.,
May 23, 1891.

TENDERS FOR COAL.

THE Directors of the Malton Gas Com-pany are prepared to receive TENDERS for the supply of about 3000 tons of GAS COAL or NUTS.

Particulars may be obtained from the undersigned.

HENRY TOBEY,
Secretary and Manager.

Gas-Works, Malton, Yorks.

THE GASLIGHT AND COKE COMPANY.

NOTICE is hereby given, that the TRANSFER BOOKS of this Company, so far as they relate to the Debenture Stocks and Bonds, WILL BE CLOSED on the Evening of Wednesday, the 10th of June next, for the Half year ending on the 30th of June, 1891, and that the Interest for that Half year will be payable on the 1st of July next, to the Proprietors registered as the holders of such Debenture Stocks and Bonds at the time of such closing of the Transfer Books, which will be re-opened for the following Half Year on the morning of Thursday, the 11th of June next.

By order,
JOHN ORWELL PHILLIPS,
Secretary and General Manager.

Chief Offices: Horseferry Road,
Westminster, S.W., May 30, 1891.

BROMLEY GAS CONSUMERS' COMPANY.

ADDITIONAL CAPITAL.

NOTICE is hereby given, that under the powers conferred by the Bromley Gas Act, 1879, the Directors are prepared to receive TENDERS for the purchase of 400 ORDINARY SHARES, of the nominal value of £10 each, in lots not being less than Five of such Shares, or a multiple thereof.

The Shares tendered for will be entitled to a standard Dividend not exceeding 7 per cent., subject to variation in accordance with a Sliding Scale as in the said Act is provided.

Conditions of sale and forms of tender may be obtained upon application to the Secretary of the Company at the Works, Bromley, Kent; or of Messrs. Latter and Willett, Market Square, Bromley, Kent.

Tenders must be sent in not later than Saturday, the 20th day of June, 1891, at Three o'clock, p.m., addressed to the undersigned, at the Company's Works, Bromley, Kent.

HENRY W. AMOS,
Secretary.

Bromley, Kent, May 21, 1891.

TO INVESTORS AND CAPITALISTS.

KETTERING WATER-WORKS COMPANY.

ISSUE OF NEW ORDINARY SHARES AND FIRST MORTGAGE DEBENTURES.

MESSRS. J. ROBINSON AND SON are instructed by the Directors to offer FOR SALE by Public Auction, in Lots, at the Corn Exchange, Kettering, on Friday, June 5, 1891, at Half-past Five for Six o'clock in the evening precisely, pursuant to the provisions of the Kettering Water-Works Act, 1889 (under which all new Shares are to be offered for sale by auction or by tender before being offered to the existing shareholders), 600 NEW ORDINARY SHARES of £10 each in the above Company, part of an additional capital authorized to be raised for the purposes of New Works now in course of construction, and which have been rendered necessary by the constantly increasing demand for the Company's Water, consequent upon the extraordinarily rapid growth of the population and industries of the town.

The Directors also invite APPLICATIONS for £5500 FIRST MORTGAGE DEBENTURES IN BONDS of £100 each, bearing interest at 4 per cent. per annum and redeemable on the 24th of June, 1898.

For information as to the Company's position, and the dividends lately paid on its present capital, with printed particulars and conditions of the present issues, and forms of applications for debentures, apply to the AUCTIONEERS; to MESSRS. G. & H. LAMB AND STRINGER, Solicitors; or to Mr. T. A. SIMPSON, Secretary and Manager, all of KETTERING.

MR. W. H. BENNETT having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their Inventions may be secured for Twelve months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

HEBBURN MAIN GAS COALS.

Produce of Gas per ton	10,500 feet.
Coke "	13½ cwt.
Illuminating Power	16 candles.

For Prices, f. o. b. Ship or delivered, apply to

W. RICHARDSON,

Hebburn Colliery Offices, NEWCASTLE-on-TYNE.

THOMAS ILLINGWORTH,

NORTH DEAN CHEMICAL WORKS,
Near HALIFAX,

MANUFACTURER OF SULPHURIC ACID
OF EXTRA QUALITY FOR MAKING
WHITE SULPHATE OF AMMONIA.

TAR, LIQUOR, AND SPENT OXIDE
Purchased for Cash against Delivery

JAMES OAKES & Co.,

ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter; and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts, and covers, and rendering leakage impossible.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD

BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.
MIRFIELD, NORMANTON.

SOOTHILL WOOD CANNEL.

Yield of Gas per Ton, over	12,000 Cubic Feet.
Illuminating Power	26 Candles.
Coke per Ton,	57 per cent. of a quality almost equal to that made from the best Coking Coal.

For Analysis and Price, apply to

The Soothill Wood Colliery Co., Ld.,
SOOTHILL WOOD COLLIERY,
BATLEY, YORKSHIRE.

ESTABLISHED 1872.

G. Coombe Stuart, F.C.S.

33, ELMFOOT STREET,
OFF RUTHENGLEN ROAD, S.S.,
GLASGOW.

PUBLIC ANALYST,

Consulting Chemist,
GAS EXAMINER, AND ASSAYER.
FEES MODERATE.

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Manufacturers of the "**Thomas**" Patent Lamps for general lighting, also for Public Buildings, Institutions, &c., and for outside purposes.

The best Regenerative Lamp in the Market.

Special quotations to Gas Companies.

CAST-IRON PIPES

FOR GAS AND WATER.

Pipes, One to Six inch Bore, kept in Stock. Also a very large assortment of all sizes of Bends, T-pieces, and Specials ready for despatch on receipt of Order.

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STEEL OF ALL DESCRIPTIONS.

SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.

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Lanemark Coal Co.,

LIMITED.

LANEMARK CANNEL AND GAS COALS.

Quotations and Analysis on application to

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NEW CUMNOCK, N.B.

Shipping Ports: All the principal Scotch Ports.

HOLMSIDE GAS COALS.

(Wrought out of Holmside and South Moor Collieries.)

PRESENT production nearly 3000 tons per working day. Area of coal about 5000 acres, including the largest remaining workable proportion of pure HUTTON SEAM GAS COAL. Analysis of HOLMSIDE GAS COAL *in bulk as shipped* gives 10,500 cubic feet of Gas per ton, of an Illuminating Power of 16¼ candles. The Sulphur is about 1 per cent., and the Ash 1¾ per cent. The Coal cokes well, and leaves 69 per cent. of excellent Coke. During the year 1890, the London Gas Companies carbonized about 400,000 tons of HOLMSIDE COALS. They are used by The Gaslight and Coke Company, the South Metropolitan Gas Company, the Woolwich (Government) Gas-Works, the Newcastle and Gateshead Gas Company, the European Gas Company, L'Union des Gaz, and by many other Gas Companies both at Home and Abroad.

MR. MARK ARCHER,

HOLMSIDE AND SOUTH MOOR OFFICES,

NEWCASTLE-ON-TYNE.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on application.

TAR AND LIQUOR PURCHASED.

JOHN CLARKSON MAJOR,

(Established 1851,)

Tar Distiller and Manufacturing Chemist,

WOLVERHAMPTON.

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PRICE'S PATENT COKE & COAL BARROW

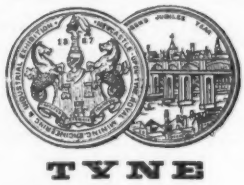
effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, 22, Alwyne Road, Canonbury, LONDON, N.

Prices are Reduced.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.



TYNE BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	70 per cent.

For Prices and complete Analysis, apply to

YOUNG, DANCE, & CO.,

COAL OWNERS, NEWCASTLE-ON-TYNE,

Or E. FOSTER & CO., 21, John St., Adelphi, LONDON, W.C.

G. WALLER & CO.'S

"PHŒNIX WASHER"

The Divisions in the Revolving Discs are filled with

"WOODEN CLUSTERS"

(As patented by them in 1883).

They are also fitted with tubes for distributing Liquor over the Clusters.

Efficient in action and small driving power.

Patent four-blade exhausters to pass from 50,000 to 500,000 feet per hour.

Patent three-blade exhausters to pass from 5000 to 40,000 feet per hour.

EXISTING EXHAUSTERS ALTERED TO PASS AN INCREASE OF 30 TO 50 PER CENT.

Using the same Valves, Connections, and Driving Power.

FRICTION 25 PER CENT. LESS THAN OTHER EXHAUSTERS.

THE DELIVERY OF GAS BEING MORE DIVIDED EACH REVOLUTION, THE GAUGE IS MORE STEADY.

Model of Four or Three Blade Exhauster on application.

MAKERS OF BEALE EXHAUSTERS FOR 300 WORKS.

PARK STREET, SOUTHWARK, LONDON, S.E.,

AND AT STROUD, GLOUCESTERSHIRE.

JOHN BROWN & CO., LTD., SHEFFIELD,

Proprietors of

ALDWARKE MAIN CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.

ALDWARKE MAIN GAS COAL

Analysis: 12,600 feet of 19-candle gas per ton.

Weight of illuminating power in pounds of sperm, 820·80. Very free from impurities.

Telegrams: "ATLAS SHEFFIELD."

NOTICE OF REMOVAL.

ALDER & MACKAY

Respectfully announce that they have removed to their newly-erected and extensive Works at Gorgie Road, Edinburgh, where in future their entire business will be conducted. The premises have been specially designed, and the Latest and Most Improved Machinery has been introduced. The Firm, therefore, are now in a better position than ever to maintain, if not to surpass, the high standard of superiority of workmanship and accuracy of registration which have hitherto characterized their Meters. The spacious accommodation at their command, and the great facilities they possess, will enable them to turn out Meters in large quantities, and to supply all orders entrusted to them with promptitude and despatch.

Brass work of every description can now be supplied; and customers are informed that nothing but the best material and workmanship will be employed.

ORIGINAL PATENTEES AND MANUFACTURERS OF DRY METERS IN CAST-IRON CASES.

Sole Makers of GREEN'S PATENT UNDERGROUND WET GAS-METERS and OGDEN'S PATENT SPINDLE TUBE FOR WET GAS-METERS.

MAKERS OF
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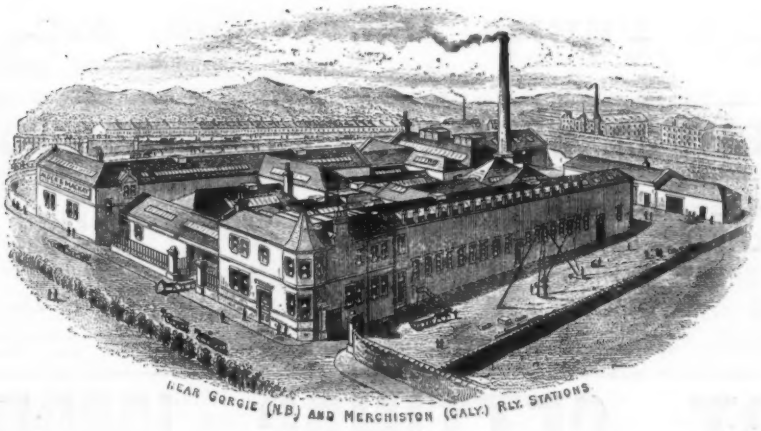
EXPERIMENTAL METERS,
TEST METERS,
PHOTOMETERS,
PRESSURE GAUGES,
GAS TESTHOLDERS.



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GAS-MAIN COCKS
AND
COUPLINGS.
STOP COCKS
of every kind.

BRASS WORK
AND
CASTINGS
to any pattern.

NEW GRANGE WORKS.

WET AND DRY METERS THOROUGHLY OVERHAULED, REPAIRED, AND MADE EQUAL TO NEW, AT THE MOST MODERATE CHARGES.

HIGHEST (Established 1850.) AWARDS.

Descriptive Circulars, Price Lists, Estimates, and full particulars forwarded on application.

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ARMSTRONG'S
PATENT
CANDLE SAFETY LAMPS.
Are a great improvement on Oil, giving a good Light requiring little or no Cleaning, and when once lighted no further attention is necessary. The Candles are made to burn 5, 7, or 9 hours.

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NEWBATTLE CANNEL.
QUOTATIONS ON APPLICATION TO
THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

PATENTS FOR INVENTIONS,
REGISTRATION OF TRADE MARKS and DESIGNS in all Countries.
SEARCHES made *re* novelty, and opinions given on all matters connected with above. *Full particulars on application to*
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Assoc.M.Inst.C.E., M.Inst.M.E., Fel. Inst. Patent Agents,
70, CHANCERY LANE, LONDON, W.C.
Special experience in Gas and Ammonia Plant.

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FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
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DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES and FIRE-CLAY and every Article suitable for
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Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
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SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

To effect a great saving in
GAS-FURNACES use our
Special Derbyshire GANNISTER BRICKS.
ADDRESS
JAMES WHITE & Co., Limited,
ALBERT WORKS, WIDNES.

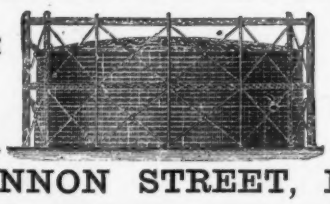
THE WENHAM COMPANY, LIMITED,
v.
THE CHAMPION GAS-LAMP COMPANY.

The Plaintiffs' Solicitors, in their notice of the judgment of Mr. Justice Vaughan Williams in this action, inserted in the JOURNAL OF GAS LIGHTING for the 26th May, 1891, omit to state that the inquiry as to damages and delivery up of lamps, to which they refer, was stayed pending an appeal by the defendants to the Court of Appeal.

The CHAMPION GAS-LAMP COMPANY has given notice of an appeal, which will be heard in due course.

F. T. PERKS, 199, Strand, W.C.,
DEFENDANTS' SOLICITOR.

W. C. HOLMES & CO., WHITESTONE IRON-WORKS, HUDDERSFIELD,
Makers of the
PATENT SCRUBBER-WASHER
PATENT EXHAUSTERS,
PATENT ANTI-DIP PIPES,
BROOK'S GAS PRODUCER.



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OF EVERY KIND.
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Illustrated Catalogues on Application.

RETORT SETTINGS IMPROVED
BY ADOPTING
THE "NUGENT" & "ROBUS" SETTINGS.
ECONOMY WITH DURABILITY GUARANTEED.
HUNDREDS OF SETTINGS WORKING EMINENTLY SATISFACTORY.
Estimates and Particulars for every Description of Retort Extensions and other Work.
J. & H. ROBUS,
CONTRACTORS FOR GAS AND WATER WORKS,
20, BUCKLERSBURY, LONDON, E.C.

Price: Morocco, Gilt, 18s.; Cloth, 15s.; Delivered Free.

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HANDBOOK

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Gas Engineers and Managers,

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Price 3s. 6d. post free (76 Pages, Demy 8vo., Limp Cloth),

THE

VALUATION OF GAS-WORKS FOR ASSESSMENT,

By THOMAS NEWBIGGING, M. Inst. C.E.,

With an Appendix containing a Statement of the most Important Cases bearing on the Question, and decided by the Superior Courts. Each of these is preceded by a Digest; and the Judgments are given in full.

WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

CONVENIENCE, SAFETY, ECONOMY.

CARNABY'S Patent Safety Gas Apparatus,

(Main Tap Regulator)

fixed in any part of the house most convenient for use, gives immediate and full control of the Gas throughout the premises, enabling the user to turn the supply on and off, and regulate its admission to the meter as required.

The **Apparatus** combined with **Pressure-Gauge** or **Locking Appliance.**

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13, BROAD STREET, BLOOMSBURY, LONDON.

Gas-Bags for Mains. High-Water Boots. Woollen Miners' Jackets.

Delivery and Suction Hose, Gutta-Percha Acid Bottles, Leather Driving Bands, Woven Canvas Hose for Fire-Engines, Wedge and Square Gas-Bags, Air and Water Beds for Invalids, Oil Tarpauling Coats, Trousers, Hats, &c., Squeegees for cleansing Pavements, &c., Billiard and Bagatelle Cush, Tricycle Tyres, Leather Hose, Cotton Waste, Engine Cloths, Oils, &c., India-rubber Waterproof Garments for Walking, Driving, or Sporting Wear, Diving and Wading Dresses, Printers' Blankets, Iron Wheels and Rollers covered with India-rubber, and Stokers' Gloves.

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Specialities in CARBONIZING PLANT.

GENERATOR AND REGENERATOR FURNACES.

OVENDEN,

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Wrought-Iron

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LAMBERT BROS., WALSALL,

MANUFACTURERS OF

WROUGHT-IRON TUBES & FITTINGS for GAS, WATER, & STEAM,

BRASS GAS-FITTINGS, GAS-VALVES, STEAM & WATER VALVES, TOOLS, &c.; AND OF

WARNER'S PATENT MARKET GAS STAND-PIPE.

LONDON: T. LAMBERT & SONS, Short Street, LAMBETH.

GAS COAL.

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REAL OLD SILKSTONE GAS COAL,

Address, THE STRAFFORD COLLIERIES COMPANY,

Near BARNSLEY, SOUTH YORKSHIRE.

WILLEY & CO.,

GAS ENGINEERING WORKS, COMMERCIAL ROAD, EXETER.

London Offices: 6 & 7, KING WILLIAM STREET, E.C.

MANUFACTURERS OF EVERY DESCRIPTION OF

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GASHOLDERS, Telescope and Single-Lift, any size. Some of the largest in the Kingdom erected by this Firm are giving the highest satisfaction.

PLANS and SPECIFICATIONS furnished for **Extensions** and **Enlargement** of existing **Works,** adapting them to the most **Improved** and **Modern Principle** of **Gas Manufacture.**

PURIFIERS, CONDENSERS, WASHERS, ENGINES and EXHAUSTERS, STATION METERS and GOVERNORS, manufactured and erected.

Makers, by permission of that eminent authority **Mr. GEORGE LIVESEY,** of his **CELEBRATED PATENT WASHER,** highly approved by all the Engineers of Works where adopted. Largely in demand.

Special reference and attention are invited to our

WET AND DRY METERS,

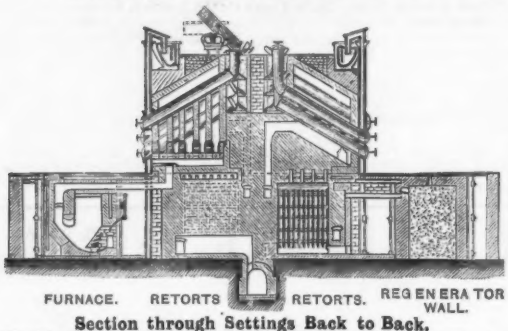
which have acquired a high reputation for the **excellence** of Materials and Workmanship; their **durability** and **accuracy** of **Register** guaranteed. They are used by several of the **London Gas Companies,** and over **200 Provincial Gas Companies.**

Price Lists, Specifications, and Estimates provided for any work appertaining to Gas Lighting, from the Retort-House to the Drawing-Room.

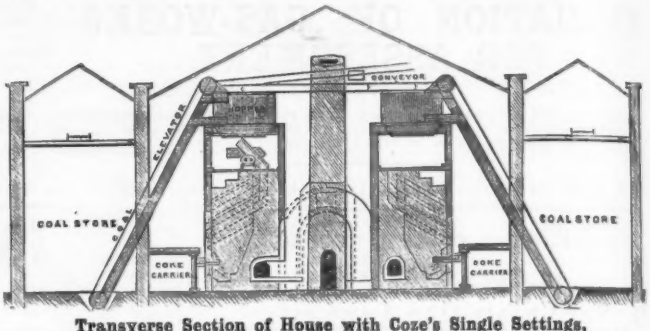
AUTOMATIC SYSTEM OF
CHARGING & DRAWING INCLINED GAS-RETORTS.

Gold Medal, Paris Exhibition, 1889.

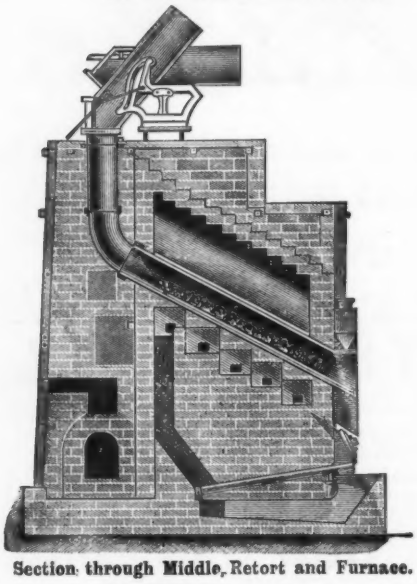
This System of Automatically Charging and Discharging Retorts without machinery or arduous labour is in operation at several places on the Continent and in America, and will shortly be at work in various Gas-Works in England.



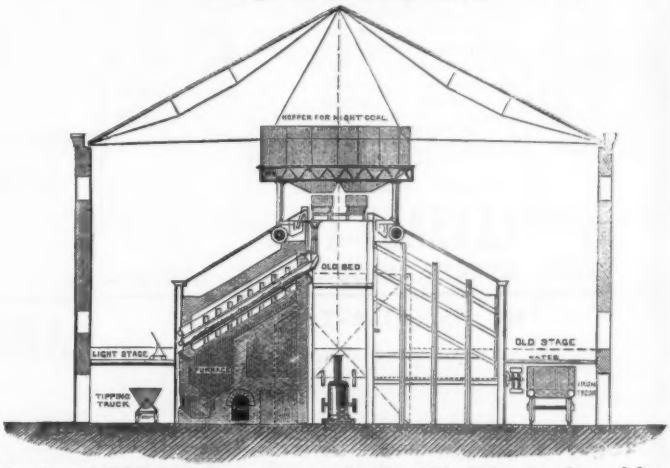
Section through Settings Back to Back. Working off ground floor with Generator under Stage and Regenerator under the Sets.



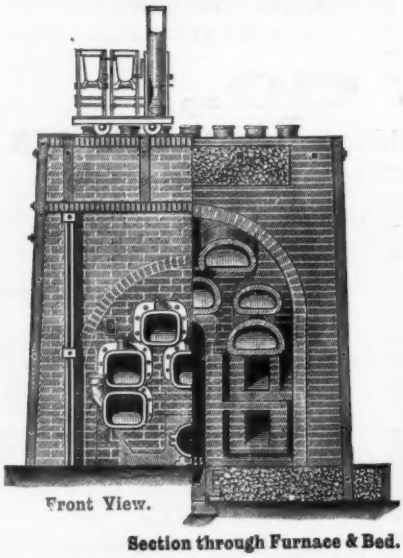
Transverse Section of House with Coze's Single Settings, Showing Method of working Two Single Settings and Distributing the Coal to the Supply Hoppers; the whole of the work being Automatic. This plan is for a large House.



Section through Middle Retort and Furnace.

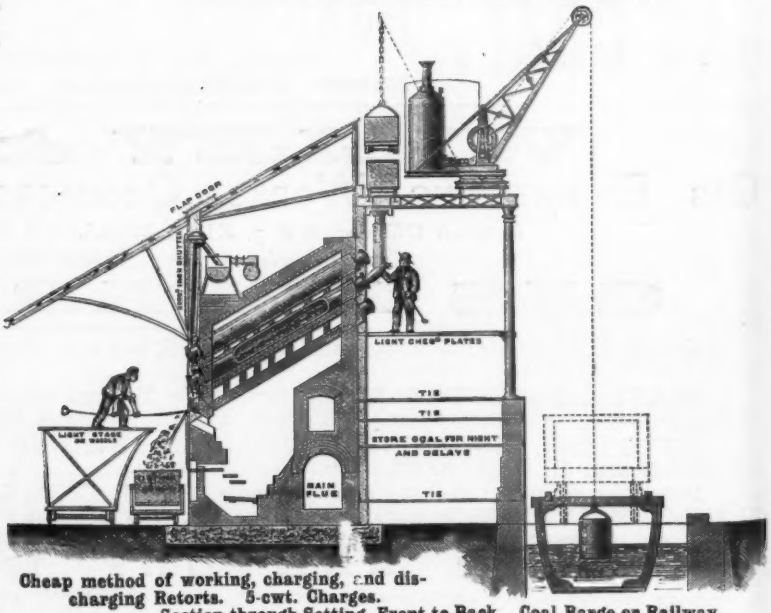


Section of old Retort-House converted, Two Sets 20 fts. in place of One. Modified form, with ordinary Retorts and Fittings.



Front View.

Section through Furnace & Bed.



Cheap method of working, charging, and discharging Retorts. 5-cwt. Charges. Section through Setting, Front to Back. Coal Barge or Railway. Light Corrugated Roof over Sets and at Sides.

These Systems are fully Patented, and any Infringer will be strictly proceeded against.

For further particulars apply to **W. M. KIGHT**, Secretary of **THE AUTOMATIC COAL-GAS RETORT COMPANY, LIMITED, 86 and 88A, LEADENHALL STREET, LONDON, E.C.**

ESTABLISHED 1825.

GAS TUBES

MANUFACTURERS OF EVERY DESCRIPTION OF

IRON OR STEEL LAP-WELDED OR BUTT-WELDED TUBES

FOR ANY PURPOSE.

THE SILICA FIRE-BRICK COMPANY,

OUGHTYBRIDGE, NEAR SHEFFIELD.

Established 1858. The First Manufactory of Silica and Dinas Fire-Bricks erected in England.

MANUFACTURERS OF

SILICA FIRE-BRICKS,

(TRADE MARK "SILICA")

Specially adapted for Siemens-Martin Gas-Furnaces; also for Gas, Copper, Iron, Steel, and other Furnaces where intense heat is required.

BESSEMER GANNISTER, STEEL-FURNACE GANNISTER, COPPER-FURNACE GANNISTER, IRONFOUNDERS' CUPOLA SAND, FINE-SETTING SILICA CEMENT, STEEL MOULDERS' COMPOSITION.

Our Silica Bricks have gained a high reputation for Unsurpassed Quality in most of the leading Firms in England and on the Continent. Export orders delivered Liverpool, Hull, Grimsby, or the Tyne.

WEST'S GAS IMPROVEMENT Co., Ltd.,

(Mr. JOHN WEST, M. Inst. C.E., *Managing Director*),

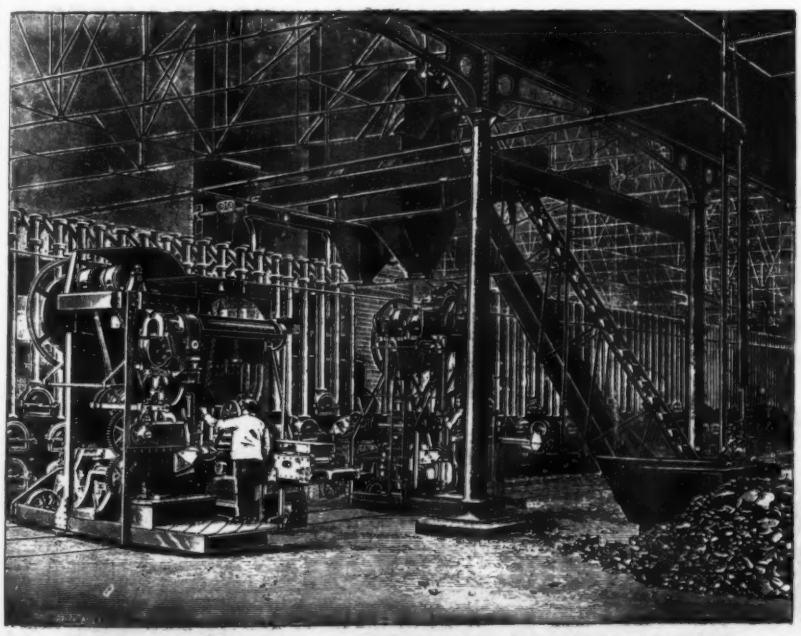
Engineers, Ironfounders, and Contractors,

ALBION IRON-WORKS, MILES PLATTING, MANCHESTER,

Manufacturers of

WEST'S PATENTED MACHINERY FOR CHARGING AND DRAWING GAS-RETORTS.

OVER **180** MACHINES AT WORK AND IN COURSE OF CONSTRUCTION.



INTERIOR OF RETORT-HOUSE, SHOWING WEST'S PATENTED POWER CHARGING AND DRAWING MACHINERY.

MANUAL CHARGING AND DRAWING MACHINES.

POWER CHARGING AND DRAWING MACHINES.

COAL BREAKING, ELEVATING, AND CONVEYING MACHINERY.

COKE BREAKING, CONVEYING, AND WASHING MACHINERY.

OXIDE ELEVATING MACHINERY.

COKE BARROWS, VALVES, AND ALL GAS-WORKS PLANT.

RETORT MOUTHPIECES

WITH SELF-SEALING LIDS,

FITTED WITH

KING'S PATENT FASTENINGS.

N.B.—The whole of these Fittings are made of Wrought Iron.

"THE METEOR."

NEW HIGH-POWER GAS-LAMP.

Westphal's Patent.

Gas Companies should hire these Lamps to their Consumers, and introduce them for Street Lighting as a rival to the Electric Light, as they do not get out of order, are most economical, and the Burner being a circular slit does not choke up.

Particulars and Prices Free.

HENRY GREENE & SONS,

SOLE CONSIGNEES FOR GREAT BRITAIN & COLONIES,
153 TO 155, CANNON STREET,
LONDON BRIDGE, E.C.

TELEGRAPHIC ADDRESS: "GAS LEEDS."

CLAYTON, SON, & Co.

LIMITED,
LEEDS,
MAKE

RETORT LIDS

OF ALL FORMS AND SHAPES
IN IRON OR STEEL
BY SPECIAL HYDRAULIC
MACHINERY.

LONDON OFFICE, 60, QUEEN VICTORIA STREET, E.C.

PRICES ON APPLICATION.

SPENT LIMES NO LONGER WASTE PRODUCTS.

Under G. R. HISLOP'S PATENTS

All Spent Limes are most effectually, economically, and continuously recovered, and at from one-third to one-half the cost of New Lime. The results are a surprise to all who have inspected the process, and are entirely satisfactory to all now using it. Descriptive Pamphlet and Terms from Agents as under.

— REGENERATIVE SETTINGS OF RETORTS. —

Hislop's Patent Producer and Patent Charging Appliances offer advantages which are unapproachable, while in every other detail his Settings are confidently recommended as being the most inexpensive and effective possible.

Illustrated Pamphlet and Terms on application to J. E. FISHER, Stourbridge, Agent for England and Wales; to C. M. HAMILTON, Portland Place, Hamilton, Agent for Scotland and Ireland; and for all other Countries to the Patentee,

Geo. R. HISLOP, Gas Engineer, PAISLEY, N.B.

G. J. EVESON,

GAS COAL AND CANNEL CONTRACTOR,

PATENTEE OF

A SPECIAL COMPOUND

FOR THE CURE OF STOPPED ASCENSION-PIPES,

A couple of charges of which will clear a stopped pipe, and an occasional charge keeps them clean, and also increases the make per ton and the illuminating power.

PRICE AND PARTICULARS ON APPLICATION.

Head Office: CORPORATION STREET, BIRMINGHAM.

ASHMORE, BENSON, PEASE, & CO., LTD., STOCKTON-ON-TEES.

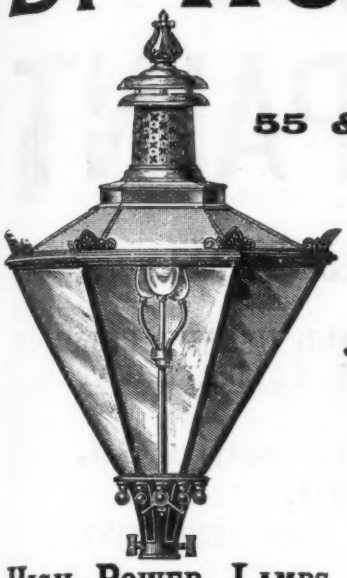
TELEGRAMS
Gasholder
MAKERS OF LARGEST GAS HOLDER IN THE WORLD
STOCKTON-ON-TEES
ASHMORE BENSON PEASE & Co
SIMPLE IN CONSTRUCTION
EFFECTIVE IN RESULTS
SULPHATE PLANT
ECONOMICAL IN COST & SPACE
MAKERS OF
ALL GAS PLANT &
Every kind of Constructional Ironwork
OIL GAS PLANT FOR WORKS VILLAGES & MANSIONS
PEASE'S Patent WIRE ROPE SYSTEM
for Guiding Gasholders. Effecting a Saving of 25 per cent in Cost

D. HULETT & CO., LTD.,

GAS ENGINEERS,

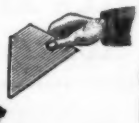
55 & 56, HIGH HOLBORN, LONDON,

Manufacturers of every description of Gas-Fittings.



HIGH-POWER LAMPS

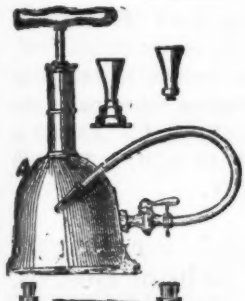
Of every description, fitted with Copper Tops, Porcelain Cones, and Regulating High-Power Burners.



HULETT'S PATENT

STREET LAMPS.

No putty required.
Glass secured by hinged clips. No loose parts.
A new pane of glass can be fitted in a few minutes by any inexperienced person.
Glass can be supplied cut ready for use.
The frames are not liable to be damaged as in ordinary lamps when hacking out a broken pane of glass.
The glass can be removed for repainting.
Several thousands of these are now in use, giving general satisfaction.
They are strongly made, and of the best material.



HULETT'S IMPROVED

SERVICE CLEANSER

For Removal of Obstructions in Gas Service Pipes.

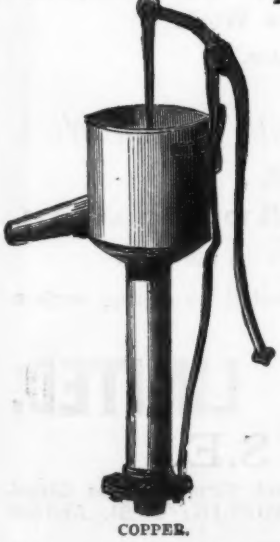
They are constructed with Air Vessels of great strength and capacity for storing a large quantity of air, which can be delivered at a pressure of 150 lbs. if necessary.

They are also fitted with Water Fittings, so that about a gallon of liquid can be discharged with the air, for removing Naphthalene from the interior of tubes.

WET AND DRY GAS-METERS.

GAS PRESSURE GAUGES.

WROUGHT OR CAST IRON TUBES AND FITTINGS.



COPPER.

BRASS.

SYPHON PUMPS,

In Iron, Brass, and Copper.

IRON.

CAST-IRON SYPHONS FOR MAINS.

LAMP-POSTS.

CRADLES AND BRACKETS.

— PRICE LISTS UPON APPLICATION. —

BELL'S ASBESTOS AQUOL PAINT

TRADE MARK. BELL'S ASBESTOS.

IS MADE READY FOR USE.

IS FIRE RESISTING.
IS WASHABLE.
IS NON-POISONOUS.
IS MANUFACTURED IN ALL USEFUL COLOURS.
IS IMPERVIOUS TO HEAT, COLD, OR WATER.
IS WITHOUT SMELL.

No expensive Oil or Turpentine required.

WILL NEVER BLISTER.

HAS A COVERING CAPACITY 40 PER CENT. GREATER THAN LEAD PAINTS.

For Outside or Inside Work in any Climate.

Bell's Asbestos Aquol Paint is equally suitable for the finest decorative work as well as for general painting. It can be applied over or under any other paint, and, owing to its easy application, can be used with a large distemper brush; the SAVING THUS EFFECTED IN LABOUR BEING **50** PER CENT. OVER THAT OF LEAD PAINTS.

Bell's Asbestos Aquol Paint is susceptible of the most delicate treatment; and, owing to its perfect flatted surface, it brings up the varnish in a manner that no other paint can equal. ONE COAT OF VARNISH ON **Bell's Asbestos Aquol** IS EQUAL TO TWO COATS ON ORDINARY PAINT.

BELL'S ASBESTOS AQUOL PAINT is specially adapted for Private Houses, Exhibition Buildings, Ships, Churches, Asylums, School Boards, Railway Stations, and all work of Wood, Iron, Cement, Plaster, Stone, Brick, &c., &c.

Those who Study Economy and Protection from Fire should use only

BELL'S ASBESTOS AQUOL PAINT.

BELL'S ASBESTOS AQUOL PRIMING is made Ready for Use.
BELL'S ASBESTOS AQUOL PRIMING stops all suction of Wood, Cement, Plaster, &c.
BELL'S ASBESTOS AQUOL PRIMING should be applied to all New Work.

Suitable for Ceilings, Walls, and New Wood, and is very durable.

BELL'S ASBESTOS AQUOL KNOTTING, for Stopping Knots in New Work.

AN EXCELLENT CURE FOR DAMP WALLS.

Colour Cards and Price Lists on Application.

Supplied in Casks of 5 to 7 cwt., and Iron Drums of 28, 56, and 112 lbs., Sample Tins of 7 and 14 lbs.

Owing to its Covering Capacity, a SAVING IN FREIGHT of 40 per cent. is effected for a given surface.

BELL'S ASBESTOS COMPANY, LIMITED,

SOUTHWARK, LONDON, S.E.

DEPOTS—MANCHESTER: Cable Street, Blackfriars. **LIVERPOOL:** 2, Strand Street, James Street. **HULL:** Humber Dock Basin. **GLASGOW:** 35, Robertson Street. **DUBLIN:** 2, St. Andrew Street. **BERLIN, BARCELONA, and ANTWERP.**
AGENTS—BIRMINGHAM BELL and Co., John Bright Street. **BRISTOL:** ROBERT STOTESBURY. 114, Redcliff Street. **CARDIFF:** BELL and Co., West Bute Street.

BELL'S ASBESTOS

EXPANSION SHEETING.

The above, which can only be obtained from this house, is recognized as the **most efficient and economical jointing material in use.** It is composed of a specially-prepared India-rubber Compound, protected by a covering of Vulcanized Asbestos Sheeting, as shown above; and as it is the only Jointing Material which adequately **combines permanent elasticity with heat resistance,** the advantage it possesses will at once be seen.

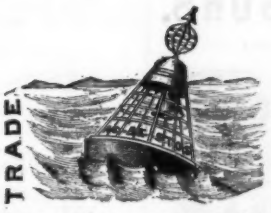
EXPANSION RING.

The centre from which the requisite elasticity is obtained will adapt itself to uneven surfaces to which it may be applied, and allow the expansion and contraction to be fully taken up. The covering being of Asbestos Cloth imparts a protection to the centre, and so prolongs its elasticity. **For Manhole, Mudhole, Steam Pipe, and Mash Tun Door Joints, it is unequalled;** and if applied as directed, **a ring can be used many times over.**

Made from 1-Ply for Cylinder and Faced Joints to any thickness for Uneven Surfaces.

BELL'S ASBESTOS CO., Ld.

DEPÔTS.
MANCHESTER: Cable St., Blackfriars.
LIVERPOOL: 2, Strand St., James St.
HULL: Humber Dock Basin.
GLASGOW: 35, Robertson Street.
DUBLIN, BERLIN.



BELL'S ASBESTOS.

DEPÔTS.
BARCELONA, and ANTWERP.

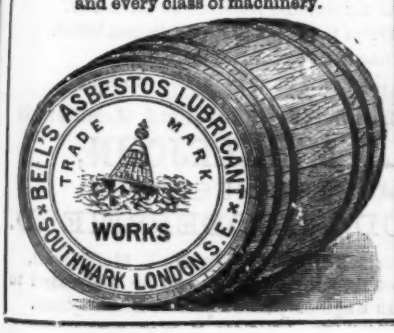
AGENTS.
BIRMINGHAM: BELL and Co., 7, John Bright Street.
BRISTOL: ROBERT STOTESBURY, 114, Redcliff Street.
CARDIFF: BELL and Co., West Bute St.

Southwark, London, S.E.

BELL'S ASBESTOS
YARN AND SOAPSTONE PACKING
BEST LOCOMOTIVE PACKING made.

BELL'S
COMPOUND HYDRAULIC PACKING
Is specially suited for Hydraulic Machinery, Accumulators and Ammonia and all Pumps.

BELL'S ASBESTOS LUBRICANT
Is unequalled
For Steam-Engines & Cylinders, Gas-Engines, and every class of machinery.



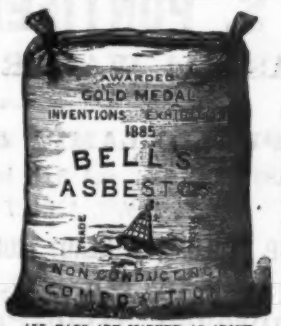
BELL'S ASBESTOLINE
The reputation of this Lubricant is based on the experience of thousands of users, which places it far in advance of those who rely only on mere laboratory tests.

ASBESTOLINE IS THE CHEAPEST MOST EFFICIENT, CLEANEST MOST INODOROUS AND SAFEST LUBRICANT.

ASBESTOLINE HAS SAVED 90 PER CENT. OVER OIL.
Has been used for all purposes, AND BEATEN ALL OTHER LUBRICANTS IN ACTUAL WORK.

BELL'S ASBESTOS
"DAGGER" PACKING
Is unequalled for every kind of Marine and Land Engine, Steam-Pumps, &c., and has proved itself to be the most efficient, durable, and economical Packing made.

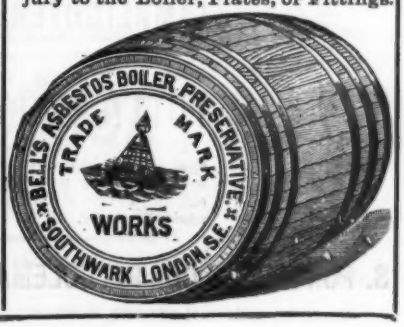
BELL'S ASBESTOS
NON-CONDUCTING COMPOSITION.
Will reduce loss by radiation and save 40 per cent. of fuel.
Is superior to any other, and saves its cost in a few months.



Can be applied again after many years' service. Is sent out dry in bags: therefore cheaper than others sent out wet.

ALL BAGS ARE MARKED AS ABOVE.

BELL'S ASBESTOS
BOILER PRESERVATIVE
Will effectually keep Boilers clean, and remove any Incrustation, without injury to the Boiler, Plates, or Fittings.



HENRY BALFOUR & CO.,

LEVEN, FIFE,

MAKERS OF

GASHOLDERS

And all Classes of GAS PLANT,

REVOLVING BRUSH SCRUBBERS, FOUR-WAY VALVES.

LONDON: 13, BILLITER STREET, E.C.

THE THAMES BANK IRON CO.

UPPER GROUND STREET, LONDON, S.E.,

SUPPLY FROM STOCK

CAST-IRON RETORTS,

AND ALL KINDS OF GAS-WORKS APPARATUS.

SOCKET-PIPES FOR GAS OR WATER PURPOSES.

FLANGE PIPES FOR STEAM.

Sole Manufacturers of **LYON'S 'PATENT' GAS MAIN SYPHONS.**

AGENTS FOR

ATTERTON'S PATENT APPARATUS for CHARGING RETORTS.

WILLIAM INGHAM & SONS,

Incorporated with the Leeds Fire-Clay Company, Ltd.,

WORTLEY FIRE-CLAY WORKS,
Near LEEDS

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT

MACHINE-MADE GAS-RETORTS.

S. PONTIFEX & CO.,

GAS and WATER ENGINEERS,

Manufacturers of and Contractors for the Maintenance of

PUBLIC LAMPS & LANTERNS;

GLASS—Flint Opal, and Bent in Stock, and Cut to Sizes.

WELL LAMPS, STREET NAME TABLETS,

LAMP COLUMNS, HEAD IRONS, PUTTYLESS LAMPS.

LANTERNS COCKS, REGULATORS,

Improved High-Power Lanterns for Lighting Street Refuges and Open Spaces.

BROWN'S PATENT

LAMPLIGHTERS' TORCHES.

PROPRIETORS AND MANUFACTURERS OF

BOX'S PATENT

PUTTYLESS STREET LAMP.

This Lamp may be supplied fitted with clear opal, or ribbed glass, *as also with enamel tops* if required. The necessary fittings for altering existing Lamps to this system can be supplied at moderate prices.

S. PONTIFEX & CO., 22, COLEMAN ST., LONDON.

Works: 18, STEPHEN STREET, TOTTENHAM COURT ROAD, W.

MEIKLEJOHN'S

Patent

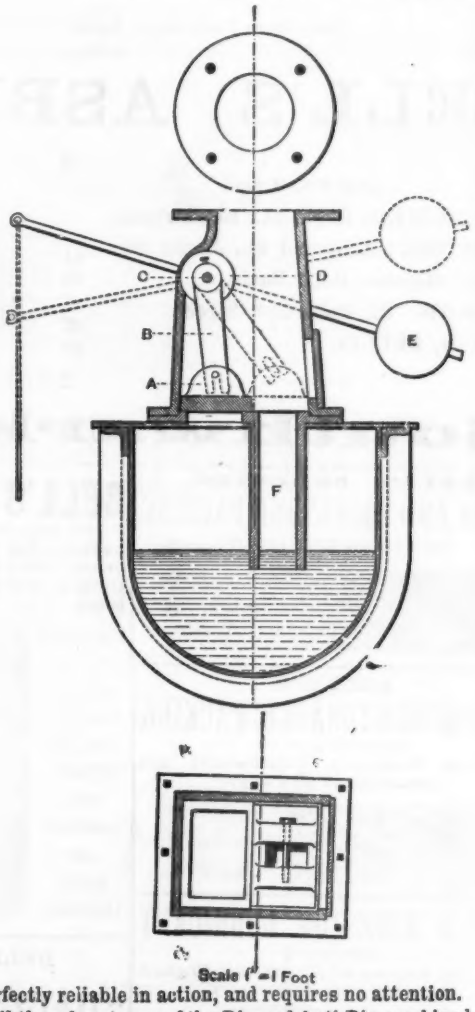
IMPROVED SLIDE-VALVE ANTI-DIP.

MR. THOS. NEWBIGGING'S REPORT.

5, Norfolk Street, Manchester, Dec. 11, 1889.

SIR,—I have examined your patent Anti-Dip arrangement, and have seen it at work on the Retort-Benches, at the Longwood Gas-Works, and the opinion which I have formed of its simplicity and certainty in working is distinctly favourable; so much so *that I consider it to be, without exception, the most efficient Appliance of the kind which has yet been introduced.* It can be applied to existing Benches with great ease, and at a minimum cost. So far as I am aware, it embodies a principle of action not previously applied in this direction.—Yours truly,

THOS. NEWBIGGING.



Is perfectly reliable in action, and requires no attention.
Has all the advantages of the Dip and Anti-Dip combined.
Is cheap, and easily fixed to any form of main.
Will more than save their cost in one season's working.

Further particulars from the Sole Patentee and Manufacturer

NEILL MEIKLEJOHN,

GAS ENGINEER,

LONGWOOD, HUDDERSFIELD.

*** During the serious illness of Mr. Neill Meiklejohn, all communications as to the above should be addressed to C. Meiklejohn, Gas Engineer, Oldbury, near Birmingham.

THE WIGAN COAL & IRON CO., LIMTD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

MIDLAND DISTRICT OFFICE: 22, TEMPLE ST., BIRMINGHAM—SOLE AGENT: A. C. SCRIVENER.
TELEGRAPHIC ADDRESS: "WIGAN BIRMINGHAM." TELEPHONE No. 200.
LONDON DISTRICT OFFICE: 6, STRAND, LONDON—C. PARKER & SON, SOLE AGENTS.
TELEGRAPHIC ADDRESS: "PARKER LONDON."

FIRE BRICKS,
LUMPS, TILES,
BLOCKS, &c.
Special Bricks for Intense Heats.

GAS RETORTS.

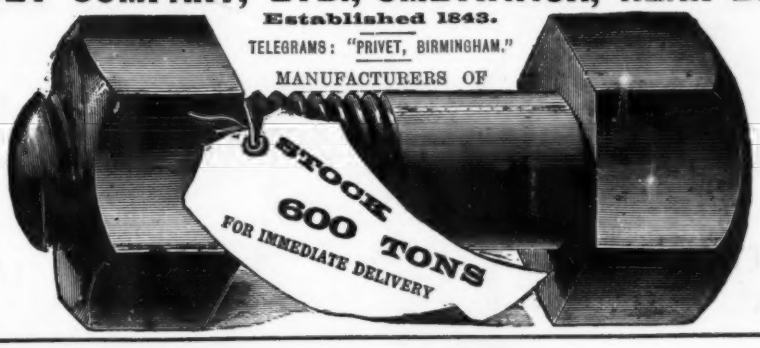
CASTINGS AND EVERY REQUISITE FOR GAS-WORKS.

MOBBERLEY & PERRY,
Fire-Brick Works, STOURBRIDGE.
Retort Setters sent to any part of the Kingdom.

PATENT RIVET COMPANY, LTD., SMETHWICK, NEAR BIRMINGHAM.

BOLTS & NUTS FOR PIPE JOINTS, FLANGE JOINTS, RETORT MOUTH-PIECES, SCRUBBERS, CONDENSERS, PURIFIERS, SIEVES, TANKS, ENGINES, BOILERS, &c., &c.

Established 1843.
TELEGRAMS: "PRIVET, BIRMINGHAM."
MANUFACTURERS OF



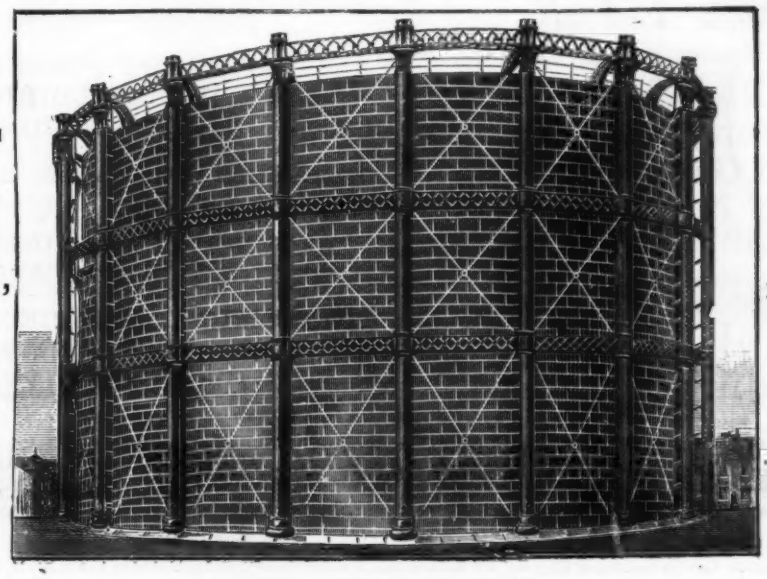
RIVETS FOR GASHOLDERS, BOILERS, GIRDERS, TANKS, COVERS, &c., &c.; ALSO SET SCREWS, WASHERS, SPIKES, AND FISH PLATE BOLTS.

THE HORSELEY CO., LTD., TIPTON, STAFFORDSHIRE,

MAKERS OF GAS HOLDERS & GAS PLANT,

PURIFIERS, SCRUBBERS, CONDENSERS, WASHERS, TANKS, VALVES, PIPES, LAMP PILLARS, RETORT-FITTINGS, ETC.

ALSO ALL KINDS OF STRUCTURAL IRON AND STEEL WORK,
BRIDGES,
ROOFS,
PIERS, ETC.



WORKS & HEAD OFFICE: TIPTON, STAFFORDSHIRE.

LONDON OFFICE: 11, VICTORIA ST., WESTMINSTER.

TELEGRAPHIC ADDRESSES: "HORSELEY, TIPTON." "GALILEO, LONDON."

W. PARKINSON & CO.,

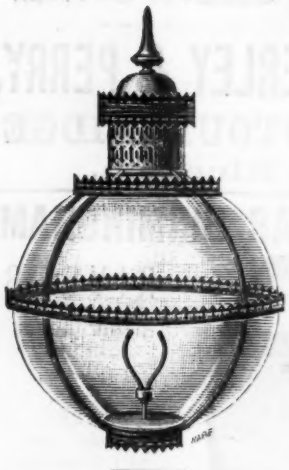
Having purchased the old-established Lamp and Meter Business of

MESSRS. JOHN BENT & SON,

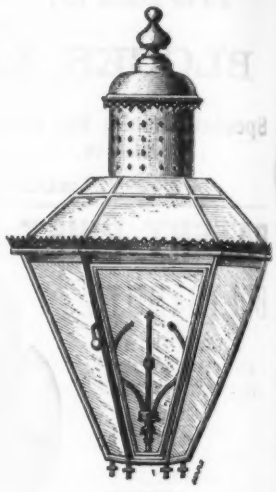
Are now Manufacturers of

IMPROVED LAMPS FOR STREET LIGHTING.

IN EVERY SIZE AND STYLE.



STREET LAMP METERS.
LAMP COCKS.



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[See also Advt., p. 1058.

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